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THE CONTRIBUTION OF PLANTATION AGRICULTURE TO THE ECONOMIC DEVELOPMENT OF GUYANA

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "The Contribution of Plantation Agriculture to the Economic Development of Guyana" submitted by Joseph Rampersaud in partial fulfilment of the requirements for the degree of Master of Science.

ABSTRACT

This study presents an economic evaluation of the effect of plantation agriculture on the economic development of Guyana. The hypothesis is that plantation agricultural resource use is incongruous to Guyana's developmental needs. The evidence indicates that despite over one hundred years of plantation ownership and exploitation of the most strategic resources - the best agricultural lands - the economy has benefited from limited growth, but remains structurally dependent. The policy issue is that economic welfare of Guyanese is not maximized in view of what is potentially available from such resources.

The analytical framework combines historical facts, empirical data and economic theory to assess the contribution of plantation agriculture to economic development since the beginning of colonial rule. The empirical evidence confirms the hypothesis that the growth impulses initially generated by the sector have long ago dissipated and increased plantation exports tend to decrease real income (welfare) or immiserize growth. Moreover, from a social point of view, plantation agricultural resource use is inefficient, and the net social benefits resulting from this type of agriculture do not compensate for the opportunity cost of the resources.

The existing economic, social and institutional framework imposed by the historical legacy of colonialism inhibits the development of a dynamic agricultural sector and, therefore, structural transformation. Structural and institutional factors inherent in plantation export agriculture constrain it to divert resources away from domestic agricultural needs. The impact of plantation agriculture is shown to be more biased towards underdevelopment than development.

The conclusion reached is that agricultural economic development cannot take off if the plantation status quo remains. The strategy which emerges is that agricultural land under plantation ownership must be nationalized and redistributed to peasant agriculture. If, and only if, this is accompanied by the appropriate supporting institutional reforms and other incentives, a dynamic agricultural sector is likely to emerge and initiate structural transformation.

PREFACE

This study leans heavily on the "structuralist" view of underdevelopment which advocates deriving a typology of economic structures and their supporting institutions and mechanisms. Only by observing the total system can inferences be made about what inhibits and what promotes transformation and development. This thesis is a modest substantiation of the need for such a view.

In assessing the contribution of plantation export agriculture to the economic development of Guyana, the analysis implicitly brings out the nature of underdevelopment of Guyana (and the Commonwealth Caribbean) as perceived by Caribbean and Latin American structuralist economists. The situation is that the export-import, structurally dependent nature of Guyana's economy was historically created. But the existing institutional framework governing resource ownership and use (e.g., the multinational plantation agriculture) is incapable of mobilizing domestically generated economic surplus towards structural transformation of the economy.

I wish to thank my supervisor Dr. W.E. Phillips for his discussion, comments and corrections. The data collection for this study was an arduous task. Here, I am extremely indebted to Ahmad Ali of the Statistical Bureau

of Guyana, whose tremendous assistance compensated for the hostility I encountered. My gratitude also to Professor Clive Thomas and Dr. Maurice Odle whose courses stimulated and exposed me to the literature. Discussions with and facilities granted through my friend, Professor Michael Wagner of McGill University, were invaluable. Evelyn Shapka was very kind and helpful with the mechanics and editing of the thesis. And most of all, my deepest gratitude to Ano for her tender encouragement when my motivation and patience waned.

TABLE OF CONTENTS

		Page
ABSTRACT		iv
PREFACE		vi
LIST OF TABLES		x
INTRODUCTION		1
CHAPTER		
I	THE ECONOMY OF GUYANA	5
	Economic Features	5
	The Sugar Plantation in the Economy	12
II	DEVELOPMENT CRITERIA AND PERSPECTIVES	19
	The Growth-Development Syndrome	19
	Structural Transformation, An Index of Development	21
III	PLANTATION DEVELOPMENT IMPACT	28
	Impact on Early Development	28
	The Net Social Contribution	36
	Output, Investment and Revenue	37
	Employment and Underemployment	41
	Choice of Technology	46
	Wage Rate-Productivity Relations	50
	Input-Output Structure	52
IV	UNDERDEVELOPMENT BIASES OF PLANTATION AGRICULTURE	59
	Plantation Enclave Dualism	60

CHAPTER Page

Inefficient Allocation of Resources... 71

The Supply Response Model..... 74

Results and Inferences..... 76

Sociological Biases..... 83

V CONCLUSION AND POLICY IMPLICATIONS..... 86

SELECTED BIBLIOGRAPHY..... 97

APPENDICES..... 102

LIST OF TABLES

Table		Page
1.1	GDP at Current Factor Cost, 1969 and 1972	7
1.2	Export-Import/GDP Ratios, 1960 and 1972	8
1.3	Direct Foreign Investment as a Percentage of Net Domestic Capital Formation, 1949-1967	10
1.4	Guyana's Share of World Output of Sugar, 1950-1971	16
1.5	Comparative Costs of Sugar Production, 1944-1945	17
3.1	Sugar Industry's Contribution to GDP and Capital Formation, 1948-1957	32
3.2	Labour Force and Employment by Broad Sectors, 1956	33
3.3	Principal Exports and Total Trade, 1949 and 1959	35
3.4	Contribution of Plantation Sugar to GDP, 1960-1972	39
3.5	Gross Capital Formation by Sugar Sector, 1961-1972	40
3.6	Employment and Underemployment in the Sugar Industry	45
3.7	Comparative Earnings of Sugar Workers, 1968 and 1971	51
3.8	Input-Output Structure of Plantation Sector	55
4.1	Percentage Distribution of Census Farms by Size and Unit, 1952	64
4.2	Multiple Regression Results of Supply Response Estimation	77

Table		Page
4.3	Value of Imports of Food, 1957-1973.....	81
A.1	Analysis of Yield and Acreage in Agricultural Sector, 1970.....	103
B.1	Population and Employment, 1971 and 1972.....	106
C.1	Time Series Data for Supply Function of Plantation Sector.....	108

INTRODUCTION

The underdeveloped structure of the Guyana economy has been largely shaped by the dominance of the sugar plantation and its institutional framework. Like the rest of the Commonwealth Caribbean, certain parts of Latin America and South-east Asia, the existing social and economic organization, and the long period of economic stagnation may be attributed largely to plantation export agriculture.[1]

In the specific case of Guyana, plantation agriculture - and its supportive institutions - was one mechanism of colonialism for exploiting externally located land to provide cheap raw material (sugar and its by-products) supply for British industrial needs. Thus, the plantation in Guyana was, initially, a total institution. It transported slave - and later immigrant - labour and capital to the colony and exported semi-processed raw materials to the metropole, which in turn supplied basic foodstuff, clothing and manu-

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[1] See L. Best, "Size and Survival," Readings in the Political Economy of the Caribbean (New World Group Ltd., Kingston, Jamaica), p. 31.

facture (machinery) to the colony (hinterland).[1]

Even with the bankruptcy of the planter class and subsequent ownership transfer of the sugar plantations to what has evolved into multinational plantation firms, plantation agriculture continued to enjoy complete hegemony over the colony's production, trade, technology and social and political organization. Indeed, throughout the colonial rule, no effort was spared by the British government to preserve the plantation dominance, for the British economy's industrial growth required continued supplies of raw sugar and its by-products.

It is, therefore, not surprising that even after gaining political independence, and even though plantation hegemony has been considerably weakened, underdevelopment persists because the structural-institutional framework of the plantation is firmly entrenched in the economy. The economy is still structurally dependent[2] because the historically imposed features constrain economic activity to be externally determined.

This study examines the contribution of plantation agriculture to the economic development of Guyana, but it

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[1] It was interesting to learn from a Geography seminar at McGill University, that the salted cod produced by Mercantilist operations in New Brunswick was shipped to the West Indian slave plantations.

[2] See Chapter I for elucidation of this.

might have been equally well titled, "Plantation Underdevelopment". The analytical framework is from a political and social economy point of view. This approach is considered appropriate and warranted because, for economies like Guyana, historical factors are intrinsically tied up with its development and underdevelopment. In this instance, colonialism was the historical "ideology(?)" and the plantation system of agriculture, the institutional mechanism. As regards the social economy aspect, development as a process of maximizing "social welfare" should not be measured from a private economy point of view; inherent in underdevelopment is the wide divergence between social and private economic measures of efficiency of resource use and between private and social opportunity cost.

The period of study cannot be precisely demarcated because of the nature of the problem and availability of data. It, however, tends to impinge heavily on the years after 1900. At the same time, the holistic view taken renders it extremely difficult to maintain a thoroughly systematic approach and to avoid repetition and overlap.

Chapter I establishes the setting by providing a resumé of the underdeveloped nature of the Guyana economy and the status of the plantation sector over the years. In Chapter II, evaluation criteria for development are analyzed and postulated. This is followed by analysis of the problem proper in Chapters III and IV where the efficiency, and gross and net social impact of plantation agri-

culture on development are evaluated in relation to criteria established. Chapter V gives the conclusions and deals with some derived implications for agricultural economic development.

CHAPTER I

THE ECONOMY OF GUYANA

Economic Features

Guyana is a small underdeveloped country whose economy is heavily dependent on the production and export of the primary products, sugar and bauxite. Together, these two contribute approximately 30% to 40% of total Gross Domestic Product (GDP), while accounting for about 12% of total employment.[1] Real per capita GDP for 1972 was $G. 642 ($U.S. 292), based on a population of 786,000, and computed at 1971 prices for the years 1960-1972.[2]

The Guyana economy is classified as structurally dependent/open[3] (as opposed to functionally open), which connotes a rather high degree of openness in the form of a wide divergence between the structure of resource use for

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[1] Calculated from statistics given in the Guyana Development Plan, 1972-1976 (Government Printer, 1972).

[2] Guyana Statistical Bureau, Ministry of Economic Development (Unpublished Data).

[3] W.G. Demas, The Economics of Development in Small Countries (McGill University Press, Montreal, 1965), pp. 60-63. See also, C. Furtado, Economic Development of Latin America (Cambridge University Press, London, 1970), Chapter 8.

production and the structure or pattern of demand. In the national accounting sense, a large proportion of domestic production is for export, while most of domestic demand is satisfied through imports; and this pattern is represented by high export/GDP and import/GDP ratios - approximately 50% in each case (Table 1.2). The economy is, therefore, extremely vulnerable to the vicissitudes of international market conditions.

This type of "dependent underdevelopment" is, to a great extent a legacy of colonialism, during which, the colonies functioned as cheap sources of raw materials and as market outlets for European industrial production.[1] Consequently, the structure of production in such ex-colonial economies has remained largely divergent from consumption needs, with the domestic economies specializing in the production of one or a few primary products (agricultural products and minerals) for export.

Table 1.1 shows Guyana's Gross Domestic Product at current factor cost and the percentage contribution of major sectors. It is rather aggregated, but the aim is to indicate the importance of primary production for export and the relative size of other sectors of the economy. Table 1.2

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[1] The Royal Commission of 1883 referred to the Commonwealth Caribbean, the then British West Indies, as "...the tropical farms of the British Nation." See L. Braithwaite, "Social and Political Aspects of Rural Development," Social and Economic Studies, September, 1968.

TABLE 1.1

GDP AT CURRENT FACTOR COST ($G. mn.)

Sector	1969	Contribution %	1972	Contribution %
Agriculture, Forestry, Livestock and Fishing	88.8	20.3	104.2	19.7
Mining and Quarrying	36.0	19.6	89.7	17.0
Processing and Manufacturing	52.5	12.0	64.0	12.1
Distribution	52.3	12.0	58.7	11.1
Engineering and Construction	35.3	8.1	42.7	8.1
Transport and Communication	27.3	6.1	32.8	6.2
Financial Services	13.4	3.6	19.1	3.6
Other Services	27.2	6.2	31.6	6.0
Government	55.2	12.6	86.5	16.3
Total	438.0	100.0	529.3	100.0

SOURCE: Calculated from Economic Survey of Guyana, 1972, Statistical Bureau, Ministry of Economic Development.

TABLE 1.2

EXPORT-IMPORT/GDP RATIOS, 1960, 1972 ($G. mn.)

Year	GDP	Exports	Ratio %	Imports	Ratio %
1960	263.4	125.0	47.5	147.6	56.1
1972	529.3	299.5	56.7	297.9	56.3

SOURCE: Calculated from Statistical Abstract, 1971, Statistical Bureau, Ministry of Economic Development.

indicates the degree of structural dependence as manifested by the high ratios of exports and imports to GDP.

An integral part of the historical evolution of the type of colonial economic structure which characterizes Guyana is the dominance of foreign ownership of domestic resources or dependence on foreign capital. This takes the form of multinational corporations operating as enclave sectors in these economies. In Guyana, the multinational enclaves are the sugar and bauxite companies. The commercial banks, financial institutions and the largest wholesale/retail enterprises are also owned by multinationals.

An undesirable effect of such foreign dominated investment is the perpetuation of a considerable degree of dualism and its consequent price distortion and inefficient resource allocation in the domestic economy.[1] Generally, economic activity is severely dependent on foreign trade, capital, and technology, and influenced to a great extent by foreign policy as dictated to branch plants and firms by the parent bodies located in the metropolitan countries.[2]

Direct foreign investment as a percentage of net domestic capital formation for Guyana ranged between 16% to 61% for the period 1948-1967 (Table 1.3). Almost all of the former is by the sugar and bauxite sectors, and com-

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[1] W.G. Demas, op. cit., pp. 10-15.

[2] Ibid., p. 61.

TABLE 1.3

DIRECT FOREIGN INVESTMENT AS A PERCENTAGE OF NET DOMESTIC CAPITAL FORMATION, 1948-1967

Year	D.F.I. as Percent of N.D.C.F.
1948-51	61
1952-56	21
1957-59	48
1960	43
1961	16
1962	-8*
1963	21
1964	26
1965	26
1966	37
1967	44

* This is attributable to the civil riots and political turbulence for the year 1961.

SOURCE: A. McIntyre and B. Watson, "Supplementary Notes on Foreign Investment in the Commonwealth Caribbean," Social and Economic Studies, September, 1972.

prises new inflows and reinvested profits[1] less depreciation allowances of expatriate firms.[2] This situation brings to the forefront one of the many aspects of underdevelopment of the economy: such a high proportion of foreign investment must result in large outflows (leakage) of profits and diminution of potential multiplier effects because of unconstrained repatriation of funds. The result is a significant gap between GDP and GNP.

These conventional macro economic features sketched above by no means constitute the totality of underdevelopment of Guyana. There are other manifestations and indices of underdevelopment which are not unrelated to the economy's structural dependence as imposed by colonialism. These include industrial underdevelopment, high unemployment (labour surplus), underemployment, subsistence wage levels in the peasant agricultural and plantation sectors, low per capita consumption of milk and protein foods, inadequacy of social services and a skewed distribution of income.

Guyana, like many other ex-colonial economies, (e.g., the Commonwealth Caribbean), is characterized by the type of underdevelopment which persists mainly because of

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[1] This is an anomaly for the sugar (plantation) sector as will be shown in Chapter III.

[2] Data for after 1967 are unavailable. Also, the government nationalized the larger of the two bauxite companies (ALCAN) in 1971. The proportion of foreign investment would, therefore, be less after 1967.

inherited structural factors that have placed the economy on the periphery of the international economy[1] as producer of raw materials for the industrial centres.

The Sugar Plantation in the Economy

The evolution of sugar as Guyana's major agricultural product is intricately tied up with the colonization era and the country's history. The first European settlers were the Dutch (1581), followed by the Spanish. The Dutch, however, established themselves and in 1621, the Dutch West India Company was granted a charter to settle in Guyana. The economy was at that time based on cane sugar and coffee, and in the seventeenth century, slaves were brought from Africa to work on the sugar plantations.

The country changed hands between Dutch, French and English, but finally became a British Crown Colony, with monocrop sugar in the hands of British nationals who became the planter class in the social hierarchy of slaves, planters and rulers in the economy.

When slavery was abolished in 1831, the African ex-

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[1] Raoul Prebisch, in "Commerical Policies in Underdeveloped Countries," American Economic Review, Papers and Proceedings, May, 1959, deals with Colonial "Backwash Effects" in the context of Latin America.

For a stimulating discussion in peripheric capitalism and underdevelopment, see articles by Marion Mushkat and Schapour Ravasini in Intereconomics (No. 5, 1975).

slaves, after serving their period of apprenticeship, moved away from the plantations and settled in small villages. The result was acute labour shortages on the plantations. To fill the gap, "indentured immigrants" were brought from Madeira, China and India, until the system was finally abolished by the British government in 1917.

It is well known that the plantation system of settlement and production was based on the colonial rationale of availability of cheap labour (at first free slave labour). With the abolition of slavery, and of immigrant labour, a peasant class evolved comprising ex-slaves who refused to work on the plantations and who started cultivation of domestic food crops. The plantation sector, meanwhile, found it difficult to cope with price fluctuations, competition from foreign sugar producers and increased costs of production. The planter class ownership and operations of the sugar plantations were then superceded by corporate plantations which later evolved into multinational plantation firms with headquarters in the metropole (London).

This is the pattern of plantation development which also occurred in the West Indies, i.e., the present Commonwealth Caribbean territories. Hence, the classification of Guyana and these territories as "plantation economies," i.e., economies whose agricultural sector is largely export oriented and controlled by foreign multinational corpora-

tions.[1]

During the post-war years, the degree of monoculture in Guyana began to decline and agricultural diversification was progressing, though not to the extent necessary for transformation. At present, production and export of rice rank second to sugar and constitute the main peasant agricultural enterprise. Other peasant crops include coconuts, citrus, bananas, coffee, and vegetables which are mainly for domestic consumption and are cultivated by small farmers and family units.

The sugar plantations in Guyana are owned and operated by two London based companies, the Demerara Co. Ltd.[2] and Booker Brothers, for which McConnell is the parent company comprising about one hundred subsidiaries in the U.K., Canada, West Indies and Africa. The subsidiaries in Guyana are engaged in raw sugar production, rum distilling and other liquor manufacture, marketing, drug manufacture, printing, stockfeed manufacture, shipping, insurance, and retail and wholesale distribution.[3] In London, the subsidiary companies are engaged mainly in heavy manufacture, such as sugar machinery and pumps, agricultural light manufacturing,

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[1] See G.L. Beckford, Persistent Poverty (Oxford University Press, New York, 1972), pp. 44-52.

[2] The Demerara Co. Ltd. was nationalized in 1974.

[3] This gives an idea of the dominance of foreign capital and multinational corporations in the economy.

and wholesale and retail distribution.

After the second world war, Guyana's sugar industry had become a relatively high cost producer compared with other Caribbean and world producer countries (Table 1.5), Although sugar cane yields are reasonably high, the sucrose content is generally lower than say, beet sugar. Added to this, the wage rate has been trending upward over the years, mainly as a result of union pressure and government minimum wage legislation.

Thus, in 1961, after considerable lobbying and negotiations, the Commonwealth Sugar Agreement (C.S.A.) came into effect. This agreement guaranteed purchases by the U.K. of fixed quotas of sugar at negotiated prices based on costs of production indexes. The price envisaged would be "reasonably remunerative to efficient producers."[1] At present, most of Guyana's sugar is sold under the C.S.A.; the remainder is sold under preferential prices to Canada and the U.S., and the excess at world market prices. Without these preferential markets, Guyana sugar cannot be competitive in the world market.

Since the Commonwealth Sugar Agreement, several measures have been adopted by the plantation to "increase efficiency," the chief one being a considerable degree of substitution of capital for labour in the agricultural pro-

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[1] Report of the Advisory Committee Appointed to Investigate the Trade Dispute in the Sugar Industry of British Guiana, (Government Printer, December, 1965), p. 44.

TABLE 1.4

GUYANA'S SHARE OF WORLD OUTPUT OF SUGAR ('000 tons)

Year	World	Guyana	% of World Total
1950-51	23,471	196	0.5
1960	51,473	334	0.6
1965	63,854	309	0.5
1971	72,832	388	0.5

SOURCE: Calculated from: (i) Plantation Crops - A Review (Commonwealth Secretariat, London, 1973), pp. 155-156; (ii) E.P. Reubens and B.G. Reubens, "Labour Displacement in a Labour Surplus Economy," Institute of Social and Economic Research, 1962, p. 14.

TABLE 1.5

COMPARATIVE COSTS OF SUGAR PRODUCTION, 1944-1945

Country	¢ U.S. Per lb.	Short Tons Sugar Per Acre
Beet Sugar		
United Kingdom	4.75	2.09
United States	4.1	1.96
Cane Sugar		
Cuba	1.5	2.35
Puerto Rico	2.3	3.57
West Indies	2.0	3.02
British Guiana (Guyana)	3.0	2.66

SOURCE: E.P. Reubens and B.G. Reubens, op. cit., p. 13.

duction process, accompanied by expansion of acreage cultivated. These measures have led to a large displacement of labour and increased unemployment pressures in the economy. The industry is thus fraught with labour unrest and a high incidence of strikes which result in heavy production and income losses to the economy.

CHAPTER II

DEVELOPMENT CRITERIA AND PERSPECTIVES

The Growth-Development Syndrome

That the plantation sector of Guyana was "the leading sector", and that it contributed to the development of the economy, there is no doubt. In Chapter III, an attempt is made to assess the overall and net impact of the sugar industry on economic development. However, such an analysis should be preceded by clarification of what development connotes generally, and specifically, from the point of view of this type of economy.

The term "development" has given rise to much controversy and misuse among economists and laymen alike. Many speak too loosely of development by regarding it as synonymous to growth or a mere increase in real per capita income. This is all the more misleading, given the different types, causes and stages of underdevelopment facing different countries.

The meaning of growth is rather unambiguous and is generally accepted to mean an increase in real per capita income. Development, however, means at least a sustained, secular increase in real per capita income (product).

According to Thirlwall,[1] "development without growth is inconceivable," but growth can occur without development per se. Growth is a necessary but not sufficient condition for development or increase in welfare.

The mechanism of growth can be simply illustrated by using the Cobb-Douglas function specification to represent an hypothetical economy's production:

$$Q = Ae^{\lambda t} K^{\alpha} L^{\beta} R^{\delta} \text{ (time subscripts omitted)}$$

where Q represents total output

$e^{\lambda t}$ ≡ technological growth rate

K ≡ capital input

L ≡ labour input

R ≡ land and natural resources

and the parameters, α, β, δ, represent output elasticities of the respective arguments.

Given this specification, growth can occur broadly through

(i) increase in resources

(ii) increase in factor inputs (capital and labour)

(iii) increasing returns to scale ($\alpha + \beta + \delta > 1$)

(iv) improved technology.

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[1] A.P. Thirlwall, Growth and Development (macMillan Press, London, 1972), pp. 19-24.

Development, on the other hand, is properly conceived of as self-sustaining growth which entails:

(i) the generation of an adequate rate of saving/investment (capital accumulation) consistent with a particular level of growth rate, and

(ii) the crucial aspect of structural transformation, often neglected, but of singular importance and relevance to the type of economy discussed in this study.

Structural Transformation, An Index of Development

Structural transformation takes the view that, generally, resource shifts from agriculture to secondary and tertiary sectors form an integral part of the development process as characterized by the developed economies of the world today. A great deal of research on, and refinement of, the phenomenon to provide insights into the development process has been undertaken by economists. The notion which originated in the Fisher and Clarke thesis of sector growth stage, provided impetus for the work done by Rostow, Kuznets, Chenery, Lewis, Jorgenson and Ranis-Fei.[1]

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[1] For a review of the literature, see B.F. Johnson, "Agriculture and Structural Transformation in Developing Countries: A Survey of Research," The Journal of Economic Literature, June, 1970.

Chenery's empirical work[1] has lent considerable support to the notion that structural transformation is inherent in the development process as manifested by the relationship between industrial structure and high per capita income in the developed countries. He used cross-section data for 51 countries and the semi-log form of:

$$S_i = a + by + cz$$

where S_i = ith sector share in GDP (primary manufacturing and services)

y = per capita income

z = population.

Chenery and Taylor[2] later improved the model by including other explanatory variables, viz., the share of gross fixed capital formation and of primary and manufactured exports in GNP.

The results of these and other studies indicate that development as exemplified by the present developed countries followed a process of:

(i) a decline in the share of agriculture in GNP along with the proportion of labour force in agriculture. This is due primarily to demand shifts as a result of a

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[1] H. Chenery, "Patterns of Industrial Growth," American Economic Review, September, 1960.

[2] H. Chenery and L. Taylor, "Development Patterns: Among Countries and Over Time," Review of Economics and Statistics, November, 1968.

declining income elasticity of demand for food[1] and other agricultural commodities, and is associated with Engel's law of an income elasticity for food being less than one ($n_y < 1$),

(ii) an increase in the share of manufacturing in GNP and the proportion of labour in manufacturing, and

(iii) an increase in the contribution of industry to agricultural output via increased off-farm inputs of agriculture.

Chenery and Taylor found that the relationship between changes in industrial structure and rising per capita income varied among countries categorized as large industrial, small industrial and small primary producing countries. In the latter, primary production exceeds industry up to per capita income levels of $U.S. 800.[2] Needless to say, the majority of underdeveloped countries of the world today are heavily dependent on primary export and comparative advantage which reflect the effect of natural resources on production structures. This high correlation between underdevelopment and primary exporting economies, which exhibit growth but have yet to achieve some measure of transformation as depicted above, cannot be a spurious one.

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[1] Chenery found that the growth elasticity of the agricultural sector is around 0.5 as compared with 1.3 for industry and approximately 1.0 for services.

[2] Among these were Venezuela, Iraq and Malaya, by no means developed countries.

For economies like Guyana, the overall strategy for transformation has to be the inducement of a "dynamic convergence of domestic resource use and domestic demand," which Clive Thomas[1] has appropriately termed, "The Iron Law of Transformation." In relation to structural dependent economies, he observes that

> dynamic convergence of resource use and needs is a precondition specific to the requirements of overcoming underdevelopment, small size, and the domination of neocolonial relationships in the international economy.

Moveover, in order to effect such a convergence, certain structural (underdevelopment) features of the economy need to be modified. From the empirical evidence on structural transformation, and by comparison with structural relationships which inhere in underdevelopment but are absent or less pronounced in developed economies, economists have been able to identify and elucidate those which must be induced to transform the production structure.

Demas[2] sees transformation as the extent to which dualism is reduced, surplus labour eliminated, intersectoral dependence (linkages) established, the share of manufacturing increased, and diversification of production and flexibility and adaptability in resource use achieved. These criteria have been met in varying degrees in developed

---

[1] C.Y. Thomas, Dependence and Transformation (Monthly Review Press, New York, 1974), pp. 136-137.

[2] W.G. Demas, op. cit., Chapter 2.

countries and can be regarded, in summation, as the result of dynamic convergence of domestic production and demand and, therefore, development as opposed to mere growth.

At this point, and for the sake of completeness, it may be of interest to juxtapose the above criteria for structural transformation and those specific to agriculture in relation to economic development. This is all the more appropriate since for over 150 years the plantation sugar industry of Guyana has been the agricultural sector, and may still be regarded as such.

Based on the structural transformation phenomenon, the role of the agricultural sector in economic development as observed in the pattern of transformation of the present developed economies has been empirically deduced. The resulting theory[1] which was formulated is one of the more incontrovertible theories of the role of the agricultural sector in economic development.

According to the Johnston-Mellor theory, increased output and productivity in agriculture are necessary to (1) provide increased food supplies for a growing population in addition to the manufacturing sector; (2) earn foreign exchange from exports to acquire the wherewithal for capital and/or intermediate imports necessary for capital accumula-

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[1] The chief proponents are B.F. Johnston and J.W. Mellor, "The Role of Agriculture in Economic Development," American Economic Review, September, 1961.

tion;[1] (3) release labour for the development of the manufacturing sector; (4) contribute capital for the development of other sectors without reducing the level of consumption; and (5) provide the stimulus for growth of the manufacturing sector via increased rural incomes and hence purchasing power. Kuznets[2] includes explicitly, the emergence of other sectors that will provide inputs for the agricultural sector. This is the strategic linkage effects or intersectoral dependence dealt with only implicitly in the Johnston and Mellor version.

These requirements can easily be reconciled with the criteria postulated for development. It must be cautioned, however (and the theory concedes this), that export agriculture possesses little dynamism for structural transformation and can lead to "immiserising growth."

Despite differences in factor endowments and institutional and historical factors, the theory correctly points out that certain aspects of the role of agriculture in economic development "have a high degree of generality." And even though conditions prevailing in the present LDC's may be vastly different from what prevailed in the developed

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[1] My emphasis. The economy at this stage relies almost exclusively on imports for capital and intermediate goods, as is the case of the majority of LDC's.

[2] See S. Kuznets, "Economic Growth and the Contribution of Agriculture: Notes on Measurement," Agriculture in Economic Development, ed. C. Eicher and L. Witt (McGraw-Hill, New York, 1964), pp. 102-119.

economies prior to transformation, the contribution expected of the agricultural sector in economic development must be based on at least some combination or modification of those five conditions postulated by the theory.

It is in relation to the two broad facets - the saving-capital formation generation and structural transformation - that the term development is used in this study. Moreover, it is in this framework and with respect to some of those criteria discussed that the contribution of the sugar industry or plantation sector to economic development will be analyzed.

The nature of the problem renders it almost impossible to split the analysis into definite and systematic component parts, and some amount of overlapping is unavoidable. However, the analysis of the next chapter will attempt to assess how far some of the criteria are met by the agricultural sector of Guyana, as far as data constraints will allow, and to the extent that the theories are relevant.

CHAPTER III

PLANTATION DEVELOPMENT IMPACT

Impact on Early Development

The most important "development" impact of the plantation sector is the creation of economic and social infrastructure, generally acknowledged as a positive contribution of colonialism[1] to the "opening up" of ex-colonial economies. In the case of Guyana, the plantation provided the initial irrigation and sea-defence,[2] and system of roads, railways, ports, and communications, etc., which facilitated the development of other extra-plantation areas and activities. The plantations also established social overheads in the form of hospitals, schools and water supplies, thereby contributing to the health and literacy of the slaves, immigrants and, later, the populace at large; albeit, a healthy labour

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[1] See B. Higgins, Economic Development (W.W. Norton & Co., New York, 1959), pp. 444-450.

[2] Guyana is below sea level at high tide, and the Coastal strip, on which most of the economic activity is located (along with the population), has to be protected from overflowing of the Atlantic Ocean by dykes, sluices and a network of canals. The plantation constructed most of these in order to establish their farms and this had infrastructural externalities on other agricultural and economic activity.

force is crucial to productivity and profits, whether in the days of slavery or today.

The earliest technology was that of the plantation in sugar cane cultivation and raw sugar manufacture. Thus, the earliest "technicians" were trained by the plantation, and plantation technology, biological and mechanical, spilled over to the peasants, some of whom produce the plantation crop. Indeed, in the early life of the plantation sector, when the economy was monocrop, the economy's production function might have largely been determined by the parameters of the plantation production function.

Assume the production function for the economy to have been represented by:

$$Q_t = A(t)f(K_t, L_t) \quad \text{linear homogeneous of degree one,}$$

$$\frac{\partial Q}{\partial K} , \frac{\partial Q}{\partial L} > 0$$

where Q_t ≡ total output over time

$A(t)$ ≡ technical progress as an increasing function of time

K_t, L_t ≡ capital and labour inputs over time.

In the early stages of economic growth, A(t) would have been largely that of the plantation sector, the only other private sectors being a small cottage industry sector

and small scale peasant subsistence agriculture. Thus $\frac{\partial Q}{\partial L}$, productivity of labour, was largely that of the plantation sector and increasing over the years as technology improved and capital accumulation increased within the sugar industry.

Similarly, capital accumulation for the economy would have been mostly by the plantations and to a lesser extent, the then colonial government. Investment, I_t, would have been $\frac{dK}{dt} = I_t = S_t = sQ_t$, where s is assumed to be a constant fraction of output saved. Furthermore, $sQ_t = (s_p + s_g)Q_t$ with s_p, s_g representing plantation savings[1] and government surplus. These mathematical relations are just a caricature of the macro features of the economy at that time and serve merely for illustrative purposes.

Plantation and other ex-colonial economies were monetized earlier than other traditional economies, thus bypassing the traditional stage.[2] The establishment of metropolitan commercial branch banks, insurance companies and other financial intermediaries were induced by the plantation operations with the primary aim of servicing the plantation, and later, the foreign owned mining sector. This, combined with the post slavery wage system of work, which resulted in a large wage sector, is crucial to the

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[1] Savings of the plantation sector would not have necessarily been equal to plantation investment.

[2] According to Rostow's stages theory.

modernizing process[1] by providing the institutional infrastructure for mobilizing financial resources.

Then, too, there is the contribution to growth of output, capital formation (Table 3.1) and employment, both direct and indirect. The earliest data on employment are for 1956 when the sugar industry was estimated to have accounted for 30,000 or 21-22% of Guyana's total employment.[2] As indicated in Table 3.2, rice production was the second largest source of employment, followed by mining. Prior to this, however, it is obvious that during the monocrop period, and before bauxite was exploited, most of the existing employment from a rapidly increasing population was directly attributable to the plantation sector.

Other indirect employment would have resulted from multiplier effects due to tax contribution and capital formation by the sector. The colonial government's capital expenditure, comprising partly of plantation taxes, would have certainly created employment and led to multiplier effects and further growth of output and employment, even if only to a small extent. The plantations' contribution to government revenue for the years 1954 and 1957 was roughly

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[1] Sen has produced data to corroborate the inverse relationship between the size of the non-wage sector and the level of development. See A.K. Sen, Employment, Technology and Development (Clarendon Press, Oxford, 1975), pp. 17-23.

[2] E.P. Reubens and B.G. Reubens, op. cit., p. 8.

TABLE 3.1

SUGAR INDUSTRY'S CONTRIBUTION TO GROSS DOMESTIC PRODUCT AND CAPITAL FORMATION ($G. mn.)

	1948	1952	1953	1954	1955	1956	1957
Total GDP (factor cost)	108.7	160.8	178.0	193.9	193.9	209.9	226.6
Sugar percentage of total GDP	(n.a.)	20.0	19.7	16.0	15.6	15.0	16.6
Sugar Gross Capital Formation, percentage of total G.C.F.	(n.a.)	3.8	22.7	2.1	6.1	11.1	(n.a.)

SOURCE: E.P. Reubens and B.G. Reubens, op. cit., p. 3.

TABLE 3.2

LABOUR FORCE AND EMPLOYMENT BY BROAD SECTORS, MID-JULY, 1956[1]

Agriculture, Mining and Quarrying of which	66,000
Rice Cultivation and Milling	26,000
Sugar Cultivation and Processing	27,300
Mining and Quarrying	4,000
Manufacturing	19,200
Building and Construction	11,500
Transport and Communications	8,200
Distribution	18,400
Public Administration and Professional Services	15,000
Other	25,400
Total	135,000
Unemployed	29,600
Total Labour Force	164,600

[1] Complied from I.L.O. Report, 1956, and based on a sample survey which represented 86% of total population.

SOURCE: Ibid., p. 5.

20 percent.[1]

A rather significant effect of the establishment of plantation agriculture was the opening up of the economy to trade and foreign exchange earnings from exports. Trade being an integral part of the plantation system of exploitation of resources, the economy was internationalized earlier than many other primitive economies. Thus, plantation export was, and still is to a lesser extent, a valuable source of foreign exchange earnings needed for capital and other imports to facilitate capital formation and consumption in the economy. Up to 1959, exports of sugar, molasses and rum were equivalent to approximately half of Guyana's total export earnings, thereby assuming a crucial role in the economy's balance of payments.

As shown in Table 3.1, the percentage contribution of the sugar industry has been on the decline for the period 1948-1957, reflecting the economy's relatively reduced dependence on this sector and attributable to growth in other sectors. At the same time, absolute GDP originating in the plantation sector has been more or less constant (not shown in the table). Nevertheless, although data are unavailable, it is reasonable to expect that the sector's absolute and relative shares in total GDP were much higher during the earlier years, and especially in the pre-war, monocrop stage.

The contribution to capital formation has fluctuated

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[1] Ibid., p. 9.

TABLE 3.3

PRINCIPAL EXPORTS AND TOTAL TRADE, 1949, 1959 ($G. mn.)

Commodity Exports	1949	1959
Sugar	21.1	46.4
Molasses	0.4	2.3
Rum	4.8	3.5
Bauxite	12.0	24.9
Rice	3.1	12.5
Total Merchandise Exports	4	103.5
Total Merchandise Imports	49.8	110.6
Balance of Visible Trade	-3.8	-7.1

SOURCE: Ibid., p. 10.

in this period from a low of 3.8 to a high of 22.7% of the total for the economy. Again, it would be obvious that the proportion was greater when the plantation sector was the only source of any significant level of investment other than by government, as mathematically hypothesized earlier in this chapter. It must also be borne in mind that this was before the advent of bauxite extraction in the early 1900's and that for the greater part of the nineteenth century, the sugar plantations constituted not only "the" Agricultural Sector, but also the economy's raison d'être.

The Net Social Contribution

An evaluation of the contribution of production activity to economic development should take into consideration the efficiency of resource use which, in a broad context, determines the degree of welfare achieved in terms of increased consumption. In addition, since Pareto efficiency requirements of Perfect Competition do not obtain in the real world, such an evaluation should be from a "social", rather than private, point of view.

Social welfare should be seen in terms of economic alternatives open to the society and these are determined by the availability of resources, the distribution of these resources (or inputs to alternative production) and the allocation of the output to the society (consumption levels). Thus, technical inefficiency in one sector (industry) means

output can be increased without employing more factors or reducing the output of any other sector (industry), if factors are reallocated,[1] and there exists a physically attainable position that makes everyone better off. From a development point of view, resources are so scarce that the welfare losses are a serious issue.

In the case of the sugar (plantation) sector, it utilizes a significant and "crucial" proportion of the economy's scarce resources which have a "social" opportunity cost component. Thus, failure to assess the sugar industry's efficiency in terms of the social economy or the social value of output would certainly result in over-estimation of benefits and under-estimation of costs to society as a whole.

It is, therefore, necessary in this analysis that the gross development impact conceded to the sugar industry be counterpoised against the net social impact in order to evaluate its real contribution to development. The social evaluation will be more qualitative and suggestive, than quantitative and precise, because of unavailability of the necessary data.

Output, Investment and Revenue

Taking the contribution to growth of output first,

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[1] According to Pareto efficiency criteria.

Table 3.4 shows the GDP share of sugar exhibiting a definite downward trend in real terms. Its percentage contribution to real GDP (at 1971 constant prices) has declined steadily from 18% in 1960 to 12.8% in 1972. It would appear that, given its structure and modus operandi, and the international market situation, plantation sugar does not have the potential for contributing further to growth, much less to development.

As regards investment (Table 3.5), the sector's average gross capital formation for the period 1961-1972 was $G. 14.8 mn., which represents about 7.8% of average total gross capital formation for the economy.[1] This is an unsatisfactory level of investment (coefficient) relative to the size of the sector (share of GDP and depreciation allowances) and reduces its role as a dynamic "leading sector", given the resources under its control.[2] Moreover, growth in other sectors is not the kind induced by the plantation sector in any way.

In addition, the net component of investment would be

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[1] About 75% of capital expenditure is financed from depreciation reserves, while the remainder is from the Sugar Rehabilitation Fund which is based on export tax per ton sugar to facilitate the price support schemes for sugar pursued by the Guyana government and the plantation authorities in the U.K. The fund thus constitutes national resources of Guyana. As such, there is no capital inflow from abroad nor out of dividends of foreign shareholders to finance investment.

[2] See C.Y. Thomas, Sugar Economics in a Colonial Setting, Studies in Exploitation, No. 1 (Georgetown, 1970), pp. 22-25.

TABLE 3.4

CONTRIBUTION OF SUGAR SECTOR TO GDP AT FACTOR COST, 1960-1972 ($G. mn. at 1971 prices)

Year	Total GDP	Sugar GDP	Sugar % GDP
1960	351.1	63.4	18.0
1961	368.3	62.3	16.9
1962	375.6	60.8	16.1
1963	326.1	60.0	18.3
1964	361.7	51.6	14.2
1965	401.1	59.5	14.8
1966	414.7	57.5	13.8
1967	432.2	65.9	15.2
1968	434.1	61.1	14.0
1969	463.7	71.3	15.3
1970	481.1	63.3	13.1
1971	500.4	73.4	14.6
1972	482.5	61.8	12.8

SOURCE: Statistical Bureau, Unpublished Data.

TABLE 3.5

GROSS CAPITAL FORMATION BY SUGAR SECTOR, 1961-1972

($G. mn. at current prices)

Year	G.C.F. by Sugar	Sugar % of Gross Domestic Investment
1961	4.3	5.6
1962	2.4	4.3
1963	6.6	11.0
1964	6.8	12.6
1965	7.8	19.6
1966	6.6	7.1
1967	7.1	6.4
1968	9.6	9.4
1969	9.7	9.3
1970	7.9	6.5
1971	8.1	7.3
1972	9.3	7.6

SOURCE: Statistical Bureau, Unpublished Data.

less than the figures shown and, in the past decade or two, was mainly for mechanization and, therefore, labour displacement. In this respect, the plantation sector cannot be considered as making an adequate contribution to capital formation and, hence, development, as is expected of a dynamic agricultural sector.

Similarly, the tax contribution to government revenue has been declining over the years. Between 1969 and 1972, the average tax yield from this sector was $G. 4.0 mn. and that for 1975 was 3.3% of total government revenue,[1] again, a very modest contribution relative to the size of the sector. There appears to be a lack of dynamism required to produce a greater domestic surplus[2] and the necessary contribution from such a surplus to the development of other sectors.

Employment and Underemployment

The most popular development impact attributed to the plantation sector is that it is the largest single source of employment which, in a labour surplus economy, is all the more beneficial, given the industry's labour intensive technology.[3] Indeed, most of the government's preoccupation with,

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[1] Calculated from Guyana Sugar Producers' Association data and from Economic Survey, 1972, op. cit.

[2] See Chapter IV.

[3] This claim is often bandied by the sugar companies as well. Sugar is now the second largest employment sector.

and concessions and leniency to, the industry seem to have been based on the rationalization that it is probably indispensable for alleviating the unemployment problems of the economy. That this notion of benefits is grossly exaggerated, becomes obvious when the term labour intensity is appropriately defined and measured, and when the under-employment aspects are considered.

Since factors of production are not homogeneous, a social measure of labour intensity and therefore, developmental impact, should not be computed simply as $\frac{L}{K}$ $(\frac{\text{labour}}{\text{capital}})$. Some studies recommend weighing of each unit of each factor by its shadow or scarcity price to enable aggregation. Morawetz[1] has suggested a measure of (unskilled) labour intensity (x) as

$$x = \frac{\sum_i L_i \cdot w_i}{(\sum_i L_i \cdot w_i) + (\sum_i K_i \cdot r_i) + (\sum_i M_i \cdot q_i)}$$

where L_i, K_i, M_i represent the flows of services from the ith type of labour (unskilled), capital and other factor(s), respectively and w_i, r_i, q_i represent the shadow rates of

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[1] See D. Morawetz, "Employment Implications of Industrialization in Developing Countries: A Survey", Economic Journal, September, 1974.

return.[1] The size of this ratio relative to other industries determines the labour intensiveness (x), of an industry or technique. This measure is the type used in social evaluation of large projects.

In this context, however, even the crude index of labour intensity will suffice to depict the level of underemployment existing in the sector. Let the crude index of labour intensity be represented by

$$z = \frac{\sum_i L_i \cdot w_i}{\sum_i K_i \cdot r_i}$$

where w_i, r_i represent straight returns to unskilled labour and capital services respectively.

Returning to the sugar industry, there are roughly two off-grind (off-milling) periods per year which result in almost all of the field workers being totally unemployed for about twelve weeks and the factory workers employed only for a few days per week. If this seasonal unemployment is ignored, the amount of employment provided by the plantation

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[1] This measure is obviously based on a production function with constant returns to scale, where using Euler's theorem, and given a two factor production function, $Q = f(K,L)$, if each factor is paid according to its marginal product,

$$Q = \frac{\partial Q}{\partial K} \cdot K + \frac{\partial Q}{\partial L} \cdot L$$

sector may appear impressive when given in terms of average number employed. But when these are converted into man-hours or full time man days, the numerator of the labour intensive index is considerably reduced.

As illustrated by Table 3.6, for 1966, the plantation data give average weekly employment for field and factory as 18,025. The corresponding figure in full time equivalent of man days as estimated by Clive Thomas, using a 44 hour week for 52 weeks, is 14,322. Thus, the numerator $(\sum_i L_i \cdot w_i)$ of the index is significantly less.

The table also shows the downward trend of employment in the sector over the years when compared with figures for the 1956-1966 period, with the decline (not shown) largely in the field operations. From this, it is obvious that although an estimation of the denominator is not possible, the overall ratio, (z), is much smaller than the sugar authorities are wont to claim, and government to believe.

As indicated above, the labour displacement is mainly a result of heavy substitution of capital for labour in the production process, in response to an increased wages bill stemming from union demands and government minimum wage legislation. But the plantation authorities claim that it is part of their drive to increase efficiency and reduce losses.

However, as empiricized in Chapter IV, despite the mechanization bid, yields are not justifiably increased nor costs reduced. And the real constribution to employment is

TABLE 3.6

EMPLOYMENT AND UNDEREMPLOYMENT IN THE SUGAR INDUSTRY

Year	Average No. Employed[1]	Full Time Equivalent[2]
1956	27,300	19,523
....	.....	.....
....	.....	.....
1962	18,839	14,879
1963	18,789	15,301
1964	16,695	13,792
1965	18,883	15,173
1966	18,025	14,322
1974	16,300	(n.a.)*

SOURCE: [1] Guyana Sugar Producers' Association.

[2] C.Y. Thomas, op. cit., p. 31.

* To compute this would have required data on man-hours worked. These were not available for the period after 1966.

questionable, or at least, is an exaggerated claim, given two development implications which need to be critically analyzed. The first hinges on the question of the appropriate technology in the context of a labour surplus economy, and the second is inherent in wage rate productivity relations, and hence, consumption (welfare) levels obtaining in the plantation sector, vis-a-vis those in other sectors.

Choice of Technology

One of the most difficult issues in the development literature is the choice of technology in labour surplus economies, and the consequent efficiency-employment conflict. It is unfortunately true that there can be a trade off between use of capital intensive technology and employment.

Some economists offer the explanation that many LDC's in their vent for industrialization, make the price of capital artificially low relative to wages by means of over-valued exchange rates, tariff concessions on capital and intermediate imports, tax incentives, low interest rates and minimum wage legislation. The effect of these and of union pressure for increased wages unmatched by productivity increases is the distortion of factor prices in favour of capital substitution, resulting in low labour absorption in the industrial sector.

Thus in LDC's, socially efficient techniques appear inferior to techniques which are socially less efficient, but privately more profitable. It is therefore necessary

to regard the appropriate technology as the one which, in a given set of relations, maximizes social output when factors and products are shadow priced to reflect their real opportunity cost.

Other explanations present the problem as one which represents a clash between static short run efficiency and future growth, or between maximization of present output and consumption using labour intensive techniques, on the one hand, and maximization of investible surplus[1] for faster growth and higher consumption in the future using capital intensive technology, on the other. Thus, the question is basically one of choice between present and future consumption.

Both of these approaches have merit. In relation to the latter explanation, the writer subscribes to the view taken by Sen[2] that a compromise should be made by setting a time horizon within which future welfare gains must offset present welfare losses. But at the same time, such an arbitrary criterion with respect to time cannot easily be accepted by governments and planners faced with startling unemployment rates and subsistence wages, and the concomitant urban overcrowding and social problems. It is extremely difficult to put a high premium on future growth and consump-

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[1] On the assumption that capitalists have a higher propensity to save than workers. For more on this see A.P. Thirwall, op. cit., Chapter 6.

[2] See A.K. Sen, Choice of Techniques, 3rd ed. (Basil Blackwell, Oxford, 1968).

tion in these circumstances in which present consumption would seem to have greater "utility" and welfare.

With reference to the plantation technology, the first set of explanatory relations are germane to whether such capital deepening is appropriate in the developmental context. It may be opined that Guyana's exchange rate was for the most part over-valued[1] and certain capital imports are indeed given preferential tariff. But this is not to say that these factors motivated the sugar companies to substitute capital. Such a policy was devised by the company headquarters primarily for the purpose of reducing dependence on a now unionized, militant labour force which all too frequently went on strike for more and more improvement of their welfare, and this often resulted in heavy losses of crop and revenue. In addition, subsidiary companies supply most of the agricultural machinery equipment, or are local agents for such equipment.[2]

Finally, despite the many spurious reasons advanced by the plantation administration to justify its labour displacement, the overriding consideration is that yields have not increased and, according to Thomas,[3] the post-war

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[1] Sir Arthur Lewis, as head of the Caribbean Development Bank, intimated this in one of his Addresses.

[2] The subsidiaries of the plantation firms are engaged in domestic distribution of agricultural machinery and implements.

[3] C.Y. Thomas, op. cit., pp. 32-33.

mechanization bid has failed to compensate for increased costs of production, and to increase competitiveness in the "free market". It would appear that since "cheap labour" is becoming more and more scarce, the plantation sector has decided to mechanize at the expense of labour which cannot be absorbed into alternative employment. This situation is not unrelated to the colonial and present plantation structural effects[1] discussed in Chapter I.

Were all things equal; had the plantation sector achieved significant increased total productivity (yields) and increased domestic investment from the surplus; or contributed to investment in other sectors as a dynamic agricultural sector[2] is expected to do, then its choice of technology would have been unequivocally deemed appropriate. But such objectives and behaviour are incompatible with the institutional features and rationale of the plantation system of agriculture. Therefore, the technology pursued in this instance ignores the developmental needs of the economy, and though efficient from the point of view of plantation (private) profitability, it cannot but be socially inefficient. Welfare losses are uncompensated for, unemployment exacerbated and hence, net social benefits are far less

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[1] Discussed in Chapter IV.

[2] See the Dual Economy models of Jorgenson and Ranis-Fei. The Jorgenson model gives some valuable insights into the prerequisites for a viable agricultural sector.

than the potentially available benefits.

Wage Rate-Productivity Relations

It is the concensus among Caribbean economists that wage rates in the plantation sector lag far behind productivity, although no real empiricization of the relationship has been done.[1] The fact remains, however, that wage rates in this sector, especially of field workers, are the lowest in the economy and qualify for being labelled "subsistence" wage (Table 3.7). Furthermore, when compared with the cost of living index changes, the real wage rate is considerably lower, reflecting more sharply the poor levels of welfare of these workers. Table 3.7 shows the comparative wage rates for the sector for 1968 and 1971, but the situation was more appalling in the sixties.

Estimates by Thomas[2] indicate that between 1956 and 1966, productivity change, using output/labour as a measure, was 47%, while the corresponding wage increase was 45% for field workers and 35% for factory workers. He then appropriately converts the wage increases into real wages by using the Consumer Price Index. The real increase obtained was 26.5% and 16.5% for field and factory, respectively. These are the appropriate indicators, for productivity in

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[1] See H. Brewster, "Wages, Prices and Productivity in Guyana," Social and Economic Studies, June, 1969.

[2] C.Y. Thomas, op. cit., p. 50.

TABLE 3.7

COMPARATIVE EARNINGS OF SUGAR WORKERS, 1968, 1971

Sector	Average Weekly Earnings ($G.) 1968	1971
Sugar		
Field	25.42	32.51
Manufacturing		
Sugar Factory	32.61	42.86
Other Food		
Beverages & Tobacco	29.86	37.75
Other Manufacturing	28.93	32.94
Mining & Quarrying	73.00	76.00
Other Services		
Wharves	35.10	53.60
Transport & Communications	47.20	48.40
Engineering & Construction	43.20	54.95
Distributive	40.46	40.17

SOURCE: Statistical Abstract, 1971, Statistical Bureau.

physical terms can have no meaningful comparison with money wage rates. Thus, real wage rates and welfare lag behind productivity increases in the sector, and the development impact reduced from the point of view of both efficiency and consumption levels (welfare) attained.

Perhaps a more accurate measure of productivity (and efficiency) would be based on say, a production function estimation such as $Q = AL^{\alpha} K^{\beta}$ with L and K measured in flows and computing the marginal productivity of labour as $\frac{\partial Q}{\partial L} = \alpha \frac{Q}{L}$; then the marginal value product can be computed and compared with the wage rate or unit cost of labour. Since such estimates are not available, the conclusion as regards productivity-wage rate relations will depend on the acceptability of the two studies cited. But there is no doubt that "real wages" and, consequently, welfare attainment of the unskilled workers leave much to be desired, and that after so many decades of operations, diversification and profit reaping by the plantation, the workers remain in subsistence misery.[1]

Input-Output Structure

An integral aspect of structural transformation out-

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[1] From the writer's personal observation, sugar (field) workers' food consumption is far below the level considered nutritionally adequate. With large families, they barely manage to subsist, are inadequately fed, clothed and attended. Rice is the staple diet; milk is almost non-existent and meat a rarity.

lined in Chapter II is the development of intersectoral dependence (linkages), especially forward linkages stemming from agricultural production to processing and distribution. Indeed, in economies like the United States and Canada, some agricultural products have been so transformed that they have lost their agricultural identity. This is manifested by the multifarious assortment of processed, milled, canned, packaged and blended agricultural/livestock products. Similarly, some activities, previously agricultural, have been absorbed into other sectors.

This pattern, in conjunction with Engel's law with regard to the low income elasticity of demand for food and agricultural products, led to the declining share of agriculture in total product and employment in the economy. The development of the manufacturing sector also led to increased off-farm inputs of agriculture being supplied by the former. And these linkage effects, through the multiplier mechanism served to increase output, employment and consumption.

Of linkages and development, Hirschman observes

> The lack of interdependence and linkage is of course one of the most typical characteristics of underdeveloped economies. If we had homogeneous input-output statistics for all countries, it would certainly be instructive to rank countries according to the proportion of intersectoral transactions to total output; it is likely that this ranking would exhibit a close correlation with both income per capita and with the percentage of the population occupied in manufacturing.[1]

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[1] A.O. Hirschman, The Strategy of Economic Development (Yale University Press, New Haven, 1958), pp. 110-111.

He further concedes that in enclave development, primary products from mines, wells and plantations slip out of the country without leaving much of a trace in the rest of the economy. This is patently obvious in the case of Guyana, where the plantation sector operates as a vertically integrated, enclave sector within the domestic economy and as the primary resource base for other secondary activities in the metropole.

A simple, less disaggregated input-output structure for the sugar industry is given below (Table 3.8). The agricultural and processing components are, for simplicity, not separated. The aim is, of course, more illustrative than computational, since most of the inter-industry cells are zero.

As shown, interaction of the plantation sector with the other sectors is almost nil, with the exception of rum distilling and pharmaceutical manufacture, both of which use the by-products raw spirits and molasses as inputs, and are plantation enterprises. Imported inputs are, however, the bulk of total capital and raw material inputs, and domestic value added is lower than otherwise.

The plantation sector would, of course, have transactions with the engineering and construction and financial service sectors. Transportation is internal to the industry since it has its own sugar transport vehicles and wharfage-shipping and storage facilities.

The most valuable forward linkage benefit, sugar

TABLE 3.8

INPUT-OUTPUT STRUCTURE OF PLANTATION SECTOR - 1956 AND 1974 ($G. mn.)

								Final Demand				
	Sugar Cane & Processing	Other Agriculture	Rum Distilling	Pharmaceuticals	Other Man.	Distribution	Transport & Communications	Exports	Government	Gross Capital Formation	Domestic Consumption	Total Gross Output
Sugar Cane & Processing			*	*				296 (44)		-	8 (3)	337 (66)
Other Agriculture												
Rum Distilling						°						
Pharmaceuticals						°						
Other Manufacture												
Distribution												
Transport & Communications												
Imports	28 (20)									27		
Rents												
Wages **	74 (23)											
Depreciation												
Government **	91 (4)											
Profits (Surplus)	11 (2)											
Total Gross Outlay	337 (66)											

Payments (Value-Added)

* Purchases by two plantation-owned manufacturing enterprises of sugar by-products.

° Distributive activities involving rum products and drugs. Figures in parentheses represent 1956 values; figures above parentheses represent 1974 values.

** Because of the abnormally high world price for sugar and the consequent windfall profits in 1974, the government implemented a special tax on sugar revenue. The workers also received windfall income as a result of Trade Union negotiations. Hence the unusually high and impressive tax yield and wages.

refining, has been historically exported to the U.K., and yields about 40%-50% higher prices than the raw sugar exports. In addition, the bulk of the molasses and some of the raw spirits are exported and form the base for secondary and tertiary activities (some of which are carried on by subsidiaries), in the metropole (U.K.). Thus, all the multiplier effects are lost to the domestic economy, and the industry's contribution to structural transformation is almost non-existent.

The lack of intersectoral linkages and structural transformation should give rise to a greater hue and cry when it is realized that two important by-products from sugar processing, bagasse and molasses, are under-utilized. Bagasse is the residual from crushed cane and has potential for use as raw material in paper and hardboard manufacture. Instead, some of it is used for fuel while it is alleged that a large proportion is disposed of at some cost to the industry. In 1970, Guyana's imports of hardboard alone was $G. 1.1 million. Molasses has potential for economic use, for example, for animal feeds (livestock), but most of it is exported to the metropole. To be sure, in a social evaluation of the sugar industry's contribution, an appropriate discount should be made for these.

After all these years of exploiting Guyana's richest land resource, plantation agriculture has failed to establish any dynamic interdependence with other sectors. On this score, it has failed to make one of the most strategic

contributions to economic development as discussed and postulated in Chapter II.

Finally, as regards the net returns[1] of the sector to the social economy, the writer takes the view of Brewster[2] who argues that the net social returns from the (Jamaican) sugar industry is "gross private return less repatriated profits, less payments for imported materials and imported equipment, less the net diseconomies," less the net effective subsidy, less discount for risk. This is also the appropriate measure for Guyana's sugar industry.

The subsidy refers to the amount above world prices which Britain pays for Guyana's sugar exports under the C.S.A. prices. On the surface, this would make sugar more efficient and its contribution higher; but there is a "quid pro quo" in the form of reciprocal concessions made to exports from Britain and other Commonwealth countries under the Commonwealth Preferential Tariffs. This is a cost borne by the Guyana economy, since, as a result, the tariff component of government revenue is 5%-15% less, and, therefore, constitutes a subsidy. These preferential prices make imports more competitive than the potential domestic production of the commodities involved would be, and as a result,

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[1] H. Brewster, "The Social Economy of Sugar," Readings in the Political Economy of the Caribbean (New World Group Ltd., Kingston, Jamaica, 1971), pp. 51-54.

[2] Analogous to Social Project Evaluation Techniques.

inhibit import substitution. These factors contribute to the high propensity to import many unnecessary commodities (fripperies) at the expense of the balance of payments.

The diseconomies comprise all the man-hours and output loss resulting from the frequent strikes and labour unrest in the industry. There is also an unpriced externality accruing to the sugar industry in the form of heavy government expenditures on sea defences over the years. Under a user cost principle, the plantation sector would have to contribute the largest proportion compared with other beneficiaries, e.g., peasant farmers.

As regards foreign exchange earnings, almost all profits are repatriated as dividends to foreign shareholders. To this must be added the foreign exchange consumption by the industry in purchases of capital and raw material imports. Only after these are netted out can a true picture of real foreign exchange to the economy be obtained. It is clear that even a crude estimate of the net social returns to the economy from the plantation sector will yield a very low figure indeed and, consequently, a rather unfavourable development impact.

CHAPTER IV

UNDERDEVELOPMENT BIASES OF PLANTATION AGRICULTURE

So far, the contribution of the plantation sector to economic development has been found unfavourable. This was shown to be the case in relation to both the criteria for structural transformation for such an economy and some aspects of social efficiency of the sector; for the level of welfare maximization (increased consumption) is affected by both sets of relations.

This chapter explores some underdevelopment (structural-institutional) biases which inhere in the type of multinational plantation agriculture that dominates Guyana[1] and the Caribbean. It attempts to show that:

(i) the multinational structure of the plantation sector constrains it to operate as an enclave sector, exploiting resources in the manner which preserves the colonial rationale of exploitation of resources;

(ii) the plantation system of agricultural resource

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[1] Some of these comments are also applicable to the banana and sugar plantation agriculture in some Caribbean territories and perhaps to some South-east Asian plantation economies.

use leads to structural[1] biases which results in inefficient allocation of agricultural resources in favour of the plantation; and

(iii) these culminate in stagnation of the peasant sector, thus militating against the development of a dynamic agricultural sector and structural transformation.

Plantation Enclave Dualism

Enclave dualism[2] connotes a perverse behaviour of factor markets as a result of a modern sector producing primary commodities for export and co-existing with subsistence or low productivity sectors using "backward" technology. The former uses imported technology with high capital coefficients and are export oriented, thus leaving little impact on the domestic economy. The enclave sector is also generally part of a multinational corporate body with branch plants located in underdeveloped countries, exploiting their agricultural and mineral resources for processing in the metropolitan economies. The production structure of these underdeveloped (host) economies is, consequently, fragmented,

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[1] The term "structural" in agriculture describes, among other things, the relationship between inputs in agriculture - to factor flows, costs, productivity and allocation, and changes in these variables as well as agricultural output in relation to changes in income.

[2] It usually embodies social dualism and technological dualism.

the price system distorted, and resource allocation highly inefficient. In short, the economies suffer many of the underdevelopment features which characterize the Guyana economy, as discussed in Chapter I and passim throughout the study.

The enclave nature of the sugar plantations has been illustrated with regard to its inappropriate choice of technology, repatriation of profits and lack of domestic linkage effects, all in Chapter III. All these effects stem from the institutional factors inherent in the multinational structure of the plantation sector, and are tantamount to the colonial system of exploitation of resources of the colonies for development of the metropolitan economy (U.K.), with the exception that the cheap (or free) labour rationale is replaced by wage labour.

As depicted in the input-output structure, whatever sectoral interdependence exists is internal to the multinational firm and arose out of the plantation need for diversification in order to survive. Thus, we have the plantation firm engaged in manufacture of drugs and rum distilling in the domestic economy, both of which use the by-products of sugar (molasses and raw spirits). But these activities also have high capital (import) coefficients and do not therefore constitute beneficial linkages.

It is interesting to note that the same enclave effects preponderate in the South Asian plantation economies - Ceylon (Sri Lanka), Malaya, Indonesia, etc. Accord-

ing to Myrdal, the management was in alien hands, dividends and salaries repatriated or spent on consumption and capital imports. He observes that

> The plantations, like the mines, remained enclave in largely stagnant economies while the initial impulses failed [to bring about]... cumulative and self-perpetuating growth.... The plantation spurred industrialization in the Western countries but not of South Asia... their investments stimulated demand in the Western economies much more than South Asia.[1]

To reiterate, in Guyana, the multinational plantation structure has merely replaced the classic plantation institution of colonialism. Although the plantation hegemony has waned with the emergence of rice as a large export sector and the growth of other sectors, the economy still functions as an outpost (hinterland) producing agricultural raw materials for the U.K.

So far the "enclave" nature of the plantation sector has been discussed in somewhat unconventional isolation. But in reality it is invariably characterized by dualism, whether explicitly or implicitly. The justification here for dealing separately with the enclave aspects lies in convenience of analysis.

With the emergence of the peasant sector, and moreso today, resource organization in the agricultural sector of Guyana is characterized by an extreme form of technological dualism. It consists of the modern plantation sector vis-a-

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[1] Gumnar Myrdal, Asian Drama (Colonial Press, Massachusetts, 1968), Vol. I, pp. 448-450.

vis the peasant sector engaged in the production of rice, sugar, and fruits and vegetables. Rice production is reasonably mechanized, particularly on the larger farms. But the remaining peasant farming can be likened to "traditional" agriculture with respect to techniques and labour input, which is largely family labour. The plantation technology, as intimated before, is transferred directly from the metropole and reflects head office policy on production objectives consistent with the totality of the corporation's activities.

Apart from highly capital intensive techniques in plantation agriculture, the asymmetry in the production functions of the two sectors is made more pronounced by differences in the size distribution and quality of land (and other complementary inputs) used. This is the result of the plantations historically owning and "alienating" the best lands,[1] while the peasants are generally constrained to operate on small scale units of the poorest quality land. Table 4.1 represents the only data available for distribution of farms by size. Although somewhat modified now, the figures still depict the general pattern.

Given the above facts, the plantation agricultural

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[1] To preserve the plantation hegemony and British interests, the colonial government policy with regard to purchase of Crown Lands by peasants (ex-slaves initially) required that the minimum size for sale was 100 acres at $10 per acre. This was in force until 1890 and made peasant acquisition of farm land well nigh impossible, thereby inhibiting peasant sector growth and accumulation of capital. See J.R. Mandle, The Plantation Economy (Temple University Press, U.S., 1973), p. 36.

TABLE 4.1

PERCENTAGE DISTRIBUTION OF CENSUS FARMS AND FARMLAND BY SIZE AND UNIT

	Distribution of Size of Farms (Total Rhynland Acres)[1] in British Guyana by Counties, August 1, 1952				
Size Group	Total	%	Berbice	Demerara	Essequibo
0.1 - 1.9	6,351	22.5	2.190	3,329	332
2 - 4.1	8,492	30.1	3,782	2,982	1,728
5 - 9.9	6,772	24.0	2,772	1,988	2,012
10 - 24.9	4,404	15.6	2,038	1,298	1,068
25 - 49.9	1,022	3.6	326	292	404
50 - 99.9	594	2.1	186	248	160
100 and over	552	2.0	163	270	119

[1] 1 acre = 0.95 Rhynland acres.

SOURCE: Ministry of Agriculture, Economics Division.

production function may be represented as:

$$Q = AL^{\alpha} K^{\beta} H^{\gamma}$$

where Q is output (tons cane reaped), α, β, γ, represent output elasticity of labour, capital and land, respectively, and are assumed to sum to one (constant returns to scale) as deduced from the yields per acre over a long period (see Appendix C, Table C.1).

Land is not fixed in the sense that additional inputs of it can only be made at great extra cost and after a long period of time. The sector not only has large reserves of land under fallow, but also owns a considerable amount of idle (uncleared) land.

According to the table, 76.6% of farms are less than 10 acres, 19.2% are between 10 and 50 acres, and about 2% are larger than 50 acres.[1] This distribution of predominantly small scale units renders it difficult for productivity and returns to peasant farming to be anything but economically viable.

The dichotomy of production relations is yet inordinately disproportionate by virtue of the fact that the plantation lands are the most efficiently drained and irrigated. This was made possible by a system of canals and aqueducts

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[1] Although there might have been changes (increases) in the sizes, the pattern today should not be very different. Unfortunately, the most recent census figures are not yet released.

dug by slave labour and currently improved and maintained by dredging. The transportation network was built with the sugar plantations as the nucleus on the coastland, and although the initial infrastructure was laid by the Dutch, and later, the plantations, much of the colonial and current government expenditure was devoted to facilitating plantation production, distribution and export.

In the peasant sector, however, land is not only fixed, but also of the lowest fertility, and is generally considered marginal. In many instances, it is totally unirrigated; in others, inadequately so, and at the mercy of nature.[1] The losses suffered by peasant farmers - particularly rice farmers - during heavy rainfalls and drought have been all too recurrent and severe. And this has served to increase considerably the risk element for current as well as potentially more profitable crops (diversification).

The labour supply for peasant agriculture is mainly from the family for small scale rice, vegetables and mixed crop production, and family plus wage labour for larger farms (rice). In the former, the land base and productivity

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[1] Many farms outside the ambit of the plantation drainage infrastructure suffer because of lack of extra-farm drainage/irrigation system. Government infrastructural and other incentives (land development schemes) for peasant agriculture during the war years were afterwards discontinued for fear of competition with and erosion of the plantation hegemony. See J.R. Mandle, op. cit., Chapter 4.

keep diminishing over the years relative to rural population growth, thereby rendering subsistence increasingly meagre and precarious.

It is also claimed that the larger peasant farmers have to compete with the plantations for hired labour by offering comparable wages to those of the plantations, whose labour productivity is the highest in the agricultural sector; and this further reduces returns and incentives to peasant agriculture. This is, however, unsubstantiated. It probably obtains in rice production in proximity to plantation areas and can only be verified by interviewing such farmers.

Nevertheless, with regard to small scale rice producers, and certainly mixed and vegetable farming, the scarcity of capital in conjunction with poor soil and irrigation, constrains the technology to be of the low level, "traditional" type. The small size of farms and notoriously inadequate marketing infrastructure make it doubtful whether modernization, in the form of improved biological and mechanical technology,[1] will achieve any significant returns to productivity and capital; and this is with the proviso that investment funds are forthcoming.

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[1] The peasant sector depends exclusively on "minimal" government research and extension services, while the plantation sector has its own internal research facilities. Within recent years, however, in tandem with the drive for self-sufficiency in food, the government has stepped up provision of these and other institutional infrastructure.

Until a few years ago, credit availability to the small farmer was almost non-existent, since he could not meet the stringent requirements of the commerical banks (metropolitan branch banks). This is treated by Myint[1] as a "parallel dualism" in plantation economies, where "...Western commercial banks... [not only]... concentrate too much on the export sector... [but also]... tend to adopt rigid and conservative rules of credit 'worthiness'... [which result in]... perverse flows of credit."

Not only are farmers unable to get credit, but also, these banks channel funds (savings) from the domestic economy to finance growth in the metropolitan countries. In Chapter III, it was shown that the commercial branch banks were attracted to Guyana primarily to service the plantations and the export-import trade during colonial rule; over the years they have rendered no help to peasant agriculture. Thus, we have a consummate dualism in the agricultural sector, where factor distribution, quality and returns are considerably skewed between peasant and plantation production; and the coefficients of the peasant sector production function certainly sum to less than one, indicating diminishing returns to increased capital and labour inputs.

These factors notwithstanding, peasant farmers in the

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[1] H. Myint, Economics of Developing Countries (Hutchison University Library, London, 1964), Chapter 6.

Caribbean are believed to allocate resources efficiently, given the paucity of resources and lack of incentives confronting them.[1] This was undoubtedly obvious during the war years when the colonial government decided on a campaign to "grow more food" in order to circumvent shortages of imported foodstuffs. Some plantation land was diverted, and infrastructural and price incentives made available, to rice and vegetable production. The response was overwhelming. Guyana exported "ground provisions" (cassava, eddoes, and tubers) for the first time, while rice production and export received a great fillip. But no sooner was it evident that the plantation hegemony was threatened by competition for factors - chiefly labour - than the incentives were abruptly discontinued.[2]

Reverting to the issue, the peculiar type of dualism depicted here, has over the years - especially the post war period - contributed to the existence and perpetuation of surplus labour and, hence, underdevelopment. Because of smaller amounts of capital and land, and the lower level of technology, productivity - both output per man and yields - is inevitably too low in the peasant sector.

Estimates of one investigation into the sugar indus-

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[1] See D.T. Edwards, "Report on an Economic Study of Small Farming in Jamaica," Institute of Social and Economic Research (U.W.I., Jamaica, 1961).

[2] J.R. Mandle, op. cit., Chapter 9.

try,[1] determined average net profit per acre for sugar to be $G. 121.50 in contrast to $G. 76.60 for rice. Although somewhat crude, these figures do have some credibility. On the other hand, there are no estimates of average returns for the smaller (vegetable) farmers - but the gap should be significantly wider than that between sugar and rice. Indeed, as mentioned before, many peasant farmers have historically - and still do - supplement farming with plantation employment. Thus, the issue of increased productivity required for a viable peasant agricultural sector is circumscribed by institutional constraints imposed by plantation hegemony in the agricultural sector.

This low productivity, low returns syndrome, plus the rapid population growth, means increasing pressure on the rural resource base and diminishing opportunities, over the years, for rural employment. And these, in tandem with the high post-war labour displacement rate in the plantation, have been largely responsible for the massive structural unemployment (labour surplus),[2] which in turn has contributed to the burgeoning urban overcrowding, squalor, crime and

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[1] The Persaud Commission, op. cit., p. 127.

[2] Redundant or surplus labour implies low or zero productivity and, hence, an extreme form of dualism.

social problems.[1]

Also associated with this type of enclave dualism, is the fragmentation of the agricultural sector - and the economy - into disjointed sectors and markets, displaying a high differential in factor and product prices. This perpetuates rigidity of resource use and inflexibility of production structure. There is little or no substitution in consumption and production in response to prices of products and factors of production respectively. That this constitutes a severe underdevelopment bias will become more obvious in the following section.

Inefficient Allocation of Resources

In tandem with adverse dualistic effects, the multinational structure of the plantation perpetuates a socially inefficient allocation of resources in the agricultural sector as between resource organization for domestic and export production. This derives from structural biases, imposed by institutional factors governing plantation production, in the form of rigidities in resource adjustment between the two uses.

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[1] The demographic distribution of the 19th century showed most of the East Indian immigrants living on the sugar plantations, and most of the Negores in villages. In the 1940's, the urban population was 87% Negro, many of whom migrated because of antipathy to plantation work - understandably so - and perhaps lack of rural employment or resources for farming.

Guyana's agriculture can be broadly divided into two systems of resource organization: peasant production for domestic consumption and exports, and plantation export production. In the latter, resource use is externally determined in accordance with the needs of the multinational parent firm with complementary investments in the manufacture of sugar machinery, processing, shipping and marketing of the plantation output[1] (raw sugar and by-products). Consequently, decisions with respect to domestic agricultural resource use are based on input needs of the multinational corporation, consistent with global profit maximization strategy, and involving the totality of its sugar based activities. As a result, decision making with regard to agricultural resource use possesses an inherent inflexibility; and this constitutes a dynamic underdevelopment bias according to development criteria postulated in Chapter II.

Then, too, the prices paid for Guyana's raw sugar under the Commonwealth Sugar Agreement are "artificially higher than world market prices. This is tantamount to a subsidy to the plantations,[2] in that factors - other than labour - are paid higher than their marginal products. Add to this the effects of dualism imposed on the peasant sector, and the result is, ineluctably, perverse factor flows (struc-

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[1] Discussed in Chapter I.

[2] See Chapter III.

tural biases) in the agricultural sector and inefficient resource allocation in favour of plantation production. The peasant sector, which has the potential for initiating agricultural economic development, tends toward a dynamic stagnation.

Studies of multinational corporate behaviour advance the argument that, at the branch or hinterland level of production, output is not determined by the traditional criterion of equivalence of marginal cost and marginal revenue. Instead, the aim is global profit maximization based on the multiproduct, multinational activities; and hinterland production levels are largely influenced by the tax levels and political factors prevailing there (hedging).[1]

In addition, the policy (and strategy of growth) is to secure ownership of most of their sources of raw material supply - mineral deposits and agricultural land - in order to (1) reduce dependence on external sources of supply; (2) reduce prospective competition; and (3) inflate the value of their capital stock to hedge against the risk of nationalization.[2]

This strategy is certainly evidenced in Guyana, where the plantations have purchased land in excess of their fore-

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[1] See N. Girvan, "Multinational Corporations and Dependent Underdevelopment in Mineral Export Economies," Social and Economic Studies, December, 1970.

[2] G. Beckford, op. cit., pp. 166-167.

seeable needs at very low prices and have alienated the surplus from use by domestic producers. Although the modus operandi described above may be rational from the plantation (private) point of view, it creates structural rigidities and inefficient allocation of resources in the rural economy.[1]

The hypothesis that the plantation sector of Guyana does not maximize at the agricultural (or raw material) level was empiricized by estimating its supply response function.

The Supply Response Model

The econometric model specified is a variant of the Nerlovian adjustment model where land input (acreage) is the dependent variable:[2]

$$Y_t = \beta_0 + \beta_1 P_{t-1} + \beta_2 W_{t-1} + \beta_3 T_{t-1} + u_t$$

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[1] Conventional efficiency conditions for the agricultural sector are met when marginal value productivities of resources are equal within each farm, among farms, and between farming and other activities. If these do not hold, there is a divergence between social and private efficiency.

[2] See Marc Nerlove, Dynamics and Supply (John Hopkins Press, Baltimore, 1958); also Raj Krishna, "Farm Supply Response in India-Pakistan: A Case Study of the Punjab Region" in A.E.A. Readings in the Economics of Agriculture, Vol. XIII, ed. Fox and Johnson (R.D. Irwin, Inc., Illinois, 1969).

$Y \equiv$ acreage of cane actually planted in the harvest year t,

$P \equiv$ average price per ton raw sugar exported,

$W \equiv$ price of inputs as reflected by average variable cost per ton sugar processed,

$T \equiv$ yield per acre, used as a proxy for technological improvement (trend),

$u \equiv$ the error term.

The dependent variable is acreage planted rather than output of cane or raw sugar processed. This is justifiable on the grounds that output of cane is determined by biological factors, including weather conditions, and sugar yields by the sucrose content. Provided that other inputs are varied and diminishing returns to scale do not obtain,[1] acreage cultivated may be a better approximation of planned output (supply-price response) than cane reaped or sugar processed.

About two-thirds to three-quarters of Guyana's total output of raw sugar are sold under the C.S.A. guaranteed price and quota in the U.K., while the remainder is sold at preferential prices - with quotas - in the U.S. and Canada. The C.S.A. price is based on costs of production indices and is usually higher than the world market price.

The adjustment lag model chosen is believed to reflect the institutional and technological factors in agricultural resource organization in the plantation sector. Thus, the

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[1] See Raj Krishna, op. cit., for this. In the case of Guyana, the production function displays constant returns to scale.

explanatory variables chosen are lagged one year (t-1) on the assumption that it is practical for additional acreage to be cultivated and reaped in one year, for the plantations usually keep a substantial reserve of land under fallow. Acreage planted is also a function of the preceding year's price.[1] Since domestic consumption of raw sugar is negligible and Guyana's raw sugar output is too insignificant to influence world prices, no demand relation needs to be specified; therefore, the problem of simultaneous bias does not arise. The data used were for the period 1956-1974 with values for yield (T_{t-1}) computed by the writer (see Appendix C, Table C.1). Table 4.2 shows the results of the least squares estimates. The results and inferences are discussed below.

Results and Inferences

The signs of the regression coefficients are perverse, but not unexpected. Acreage of cane is not responsive, or perhaps negatively responsive, to price changes - for the price coefficient is negative and significant at the 95% level. Similarly, the cost coefficient varies positively with acreage and is significant, both at the 95% and 99% levels. This is contrary to the theory of supply, where

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[1] The C.S.A. prices are negotiated every three to four years; so the price for the amount sold under this system is known well in advance.

TABLE 4.2

MULTIPLE REGRESSION RESULTS OF SUPPLY RESPONSE FOR SUGAR CANE

Dependent Variable	Regression Coefficients			
Y_t	P_{t-1}	W_{t-1}	T_{t-1}	R^2
Acres of Cane Planted	-0.31	0.884	-2.548	0.87
	(-2.26)	(4.75)	(-3.72)	

Durbin-Watson Test for Autocorrelation - No Autocorrelation

"t" ratios in parentheses

production varies inversely with input costs. This relationship in the estimates probably reflects increased acreage to utilize more fully the mechanization discussed in Chapter III.

The yield coefficient is negative but significantly high, indicating no response of acreage or, again, a negative response to yield despite the mechanization bid. Finally, the independent variables chosen explain 87% of total variation in acreage planted which indicates that the model is a plausible specification.

The significantly negative price coefficient strongly supports the hypothesis that the plantation sector of Guyana does not maximize at the agricultural level because of the multinational global view of maximization based on the totality of sugar based production activities. Reinforced by the sheltered price received for raw sugar in the U.K. and, recently, North America, supply does not adjust to prices prevailing, but, instead, to the raw material needs of the multinational firms.

For instance, the revenue earned from Booker's shipping depends on the volume of freight (raw sugar) shipped from Guyana. Both plantation firms are engaged in the distillation, manufacturing and marketing of rum and other spirits in Guyana and the U.K., with the Booker group controlling the larger share of the market. It follows, then, that it would be perfectly rational for the plantations to increase output of raw sugar, despite adverse prices or

increased costs, given that the subsidiary firms can increase profits on their sugar related activities.[1] This is a de facto means of hedging losses at lower levels of the multinational production structure.

Although this non-maximizing behaviour at the agricultural or raw material level is efficient from the private profitability point of view of the plantation, it unfortunately perpetuates socially inefficient allocation of resources in the agricultural sector of Guyana. There is rigidity of resource use and a built in inflexibility in the economy's decision making process. Factor flows cannot respond - and do not - to peasant agricultural production reflecting domestic consumption needs; the plantation would not diversify production; the peasant sector lacks the wherewithal; and opportunities for substituting crops with higher returns and developmental impact are thwarted.

In addition to all the stagnating effects of the plantation, the artificial prices received for raw sugar make the plantation crop appear more efficient and profitable than domestic - existing and alternative - crops. Factor prices are, therefore, further distorted in a somewhat dynamic manner in favour of plantation production.

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[1] Beckford has shown that, under the C.S.A. system, Tate and Lyle sells its West Indian raw sugar to the British Sugar Board at prices above the world market price and purchases from the Board its refining requirements at world market price. This is an abominable situation, since the West Indian economies bear the social cost of this subsidy by Britain (Chapter III). See Beckford, op. cit., footnote 7, p. 160.

There is, in effect, a dynamic underdevelopment bias. Expansion of the peasant sector, diversification of the agricultural base with all the concomitant technological and entrepreneurial possibilities, and linkage benefits, are all foregone, given that the necessary and sufficient conditions for peasant agricultural development were met.

This underdevelopment bias is more sharply in focus as the economy remains structurally dependent and larger expenditures are devoted to imports of food for a rapidly increasing population. Table 4.3 indicates the proportion of import expenditure allocated to foodstuff[1] for the period 1957-1973. The porportion is between 15% and 20% of total imports for the period.

The effect of this persistent structural dependence leads to immiserizing growth.[2] In so far as expansion of plantation export diverts resources away from domestic agriculture (and production of import competing goods), the resultant real income and welfare in both the plantation sector and the rest of the economy seems to be declining.

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[1] The figures for the 1970's would have been significantly larger had not the government strategically banned and controlled importation of food items.

[2] J. Bhagwati in "Immiserizing Growth: A Geometrical Note," Review of Economic Studies, June, 1958, has derived geometrically that the likelihood of immiserization of growth is greater if the ratio $(\frac{Y}{M})$ of domestic production of import competing goods (importables) to imports is small; and also if the elasticity of demand for imports is small. Both of these conditions, in addition to the secular deterioration of terms of trade for primary exports, obtain in Guyana.

TABLE 4.3

VALUE OF IMPORTS OF FOOD ($G. '000), 1957-1973

SECTION (S.I.T.C.) 0

Year	Food Imports	Total Imports	% of Total Food Imports
1957	21,626	118,907	18.2
1958	22,069	116,408	18.9
1959	22,147	111,001	19.9
1960	24,755	147,599	16.7
1961	25,751	147,001	17.5
1962	26,956	126,277	21.3
1963	24,605	118,510	20.8
1964	28,680	149,782	19.1
1965	30,695	178,831	17.1
1966	33,432	202,006	16.5
1967	33,556	225,292	14.9
1968	35,538	219,311	16.2
1969	37,639	235,833	15.4
1970	37,295	268,240	13.9
1971	41,529	267,632	15.5
1972	41,404	297,900	14.0
1973	55,881	372,503	15.0

SOURCE: Computed from Statistical Abstract, 1972, Statistical Bureau, Ministry of Economic Development.

Growth is immiserizing because the real returns to the economy from plantation export production are decreasing. This is reflected not only in the low wages (despite increasing productivity) obtaining in the sector, but also in the rate of wage increases which are the lowest in the economy.[1]

It is somewhat ironic that in Guyana, there have been frequent and severe shortages of cooking oil that had to be met by imports of soybean oil. This is because of a lack of adequate price incentives for production of dried coconuts. Some (coconut) oil mills had to be closed down as a result of inadequate and irregular supplies. Soybean can be grown locally and could be a fairly profitable enterprise for diversification. Guyana's imports of oils and fats (S.I.T.C.4) were, on average, $G. 3.5 mn. for the years 1971-1973; and the other Caribbean territories also import oil. But the agricultural resources are bottled up within the plantation sector, while institutional factors make factor and product price(s) inordinately distorted in favour of the plantations. Moreover, diversification of agriculture would lead to competition with sugar for resources and is, therefore, inimical to plantation interests.

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[1] See C.Y. Thomas, op. cit., pp. 33-35. He also contends that growth is immiserizing.

Sociological Biases

There are also several sociological biases - against development - associated with the plantation as a total institution.[1] Some of these exert a countervailing impact on development even today. Although sociological factors are crucial variables in development, a thorough examination of those stemming from the plantation institution lies beyond the scope of this study.

The plantation as a settlement institution is responsible for the high degree of cultural pluralism existing in Guyana as well as in some other plantation economies. This was a natural consequence of the plantation rationale for bringing together the capital, labour and entrepreneurial factors to exploit land resources in a new location. In Guyana, this cultural pluralism - diverse ethnic and cultural groups - has led to a social stratification based on colour and race. This, of course, had its origin in the slave plantation structure, where social mobility depended on acquiring the white man's (European planter class) culture. The Negro slaves were forced to cast off their own culture and, later, came to regard all attributes - even skin colour - of the European planter class as superior to their own.

This was intensified in the colonial government post

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[1] See R.T. Smith, British Guiana (London, 1962).

emancipation rule, when social mobility in the now plural society - comprised of Negroes, East Indians, Portuguese, Chinese, Amerindians - depended on religious and cultural factors,[1] in addition to education. Since the introduction of Indentured Immigrants, when the East Indians "undersold" their labour services to the plantations, there has been a latent hatred between them and the Negro ex-slaves. The Guyanese politicians have also exploited this hatred by appealing to racial sympathies to solicit votes. Thus, politics, race and culture are closely interwoven in Guyana, and were the basis of a series of civil riots in the early sixties. Today, the society seethes with racial tension, exacerbated by more intense competition for relatively fewer resources.

The plantation, through the brutality, misery and degradation associated with slavery, is also largely responsible for the antipathy to, and low esteem for, agriculture on the part of Guyanese. The preoccupation with emulating European culture to increase chances of social mobility, in conjunction with the education received, has also been a contributory factor. Thus, Guyanese have developed a penchant for office or "white collar" jobs and metropolitan life style; and these are certainly socially inimical to

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[1] Even just prior to independence, qualified East Indians (Hindus and Muslems) could not gain employment as teachers in "Church-controlled" schools unless they were prepared to be converted to the Christian faith.

development of the rural sector and the economy at large.[1]

This phobia of work associated with the land also follows from the totality of the plantation institution; the education system imposed on the society catered mainly to the plantation needs; mobility on the plantation depended on acquiring clerical and technical skills for the growing plantation needs. Today, those plantation employees who have achieved these skills are promoted to the higher echelons - junior and senior staff - of plantation social structure. They further emulate the metropolitan consumption and behaviour patterns, and are made to feel superior to the field and factory (unskilled) workers.

These are but a few of the sociological biases that are, to a large extent, a historical legacy of the plantation system in Guyana. The society has developed attitudes, tastes and expectations inconsistent with developmental needs. Along with the racial disharmony - a most critical variable - the overall ethos is antithetical to that required for development.

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[1] The Guyana government adopted stern measures to counteract these biases. There is a reorientation of education to agriculture (mandatory); and many imports have been banned, including mass media; it has also instituted a compulsory National Service Scheme with a view to developing the interior and speeding up integration of the races.

CHAPTER V

CONCLUSION AND POLICY IMPLICATIONS

Plantation agricultural resource use in Guyana, by virtue of its export orientation and enclave structure, is biased towards underdevelopment. As a concomitant of its establishment as an institution of colonization, it has contributed to early modernization and growth of the economy. But given the present international market conditions for sugar, the low competitiveness of Guyana's production, and the heavy reliance on the sheltered U.K. market, significant expansion of production and export is unlikely. The sector's growth effects on the economy have long ago atrophied and are trending, ineluctably, downward.

The analysis has shown that from a developmental or "social" opportunity cost point of view, the net social contribution of the plantation sector - especially since the post-war years - is exceedingly less than the social costs to the economy. This has been shown beyond any reasonable doubt with regard to the sub-optimal choice of technique resulting in structural unemployment and underemployment, the repatriation of profits and low level of investment, the subsistence wage levels and low welfare standards of a large contingent of Guyana's labour force, and the lack of intersectoral dependence, so indispensable

to structural transformation.

Furthermore, the gross development impact must also be deflated to account for the fact that the growth impulses from plantation sugar have historically benefited industrial development of the U.K., rather than of Guyana, via the export of linkages and repatriation of domestically generated surplus. Thus, in almost every respect, plantation agricultural resource use is diametrically opposed to the development criteria established in relation to both economic efficiency and structural transformation of Guyana.

Apropos agricultural development per se, the multinational structure of the plantation sector, combined with historical and institutional factors, creates structural characteristics which result in factor and product price distortion in the agricultural sector. This in turn, leads to resource use rigidities and consequently, (socially) inefficient allocation of agricultural resources favouring the continued (private) profitability and production of the plantation crop. Peasant agriculture, on the other hand, is not only rendered incapable of responding to increased domestic demand, but also remains stagnated in the low productivity - low (subsistence) returns niche.

The situation is, therefore, a dynamic underdevelopment of the agricultural sector. The potential for increased productivity, output and a diversified agricultural base, along with opportunities for increasing employment, income per capita (welfare) and linkage effects (transformation) is

annihilated by economic and institutional forces. These effects are incongruous with the development criteria relating to efficiency and flexibility in resource use, and decision making pertaining to production structure, since the economy remains structurally dependent. They also conflict indirectly with the adaptability requirement for structural transformation, because technical and entrepreneurial skills associated with diversification of agriculture and its interaction with other sectors are also foregone.

The burning issue arising from the analysis is whether continued plantation sugar production for export represents the economically most efficient and optimal use of Guyana's best agricultural resources. Can the economy afford to remain in an inertia of dependent underdevelopment in order to cling to the immediate but sub-optimal benefits from international trade, or should it strive towards the longer term, sustained increase in per capita consumption from transformation - convergence of demand and supply - of its production structure? The analysis leads to the latter conclusion.

Plantation agriculture cannot assume the role of providing increased supplies of foodstuff or industrial raw material in congruity with population growth and developmental needs. In the first instance, sugar is a low income elasticity commodity. Then, what with the poor competitive status - temporarily beefed up by the C.S.A. and other price supports in the world market - it would be a long and

futile wait for domestic output to expand to such a volume as to be capable of financing the ever increasing imports of food.

Guyana's sugar does not possess the comparative advantage of the "golden days" of free slave (or cheap) labour. Besides, many economists have seriously questioned the neo-classical trade theory. If prices and income elasticities of the export are low, to continue supplying factors to such production worsens the terms of trade and balance of payments, and leads to immiserization of growth,[1] a situation classically exemplified by plantation export production in Guyana but difficult to evaluate or empiricoze.

The foregoing, plus the fact that the plantation diverts resources from other agricultural use, leads to the conclusion that agricultural development in Guyana will be suppressed as long as the plantation status quo remains. Therefore, the only way out must be through changing the structure of agricultural production in tandem with the ownership pattern of agricultural lands. And this entails ownership and control of agricultural land under plantation proprietorship, in addition, perhaps, to opening up new

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[1] See J. Bhagwati, op. cit. See also R. Prebish, op. cit., and S. Linder, Trade and Trade Policy for Development (Praeger, New York, 1967).
In addition, without full employment of resources and perfect competition, the comparative cost doctrine does not yield maximum efficiency and welfare.

lands in the interior.[1]

What follows is a framework for a strategy of agricultural economic development and is largely based on the implications of the analysis. It is, however, not a systematic approach, for that would warrant intensive research and planning well beyond the scope of this thesis.

Land reform will have to be of paramount importance in Guyana's strategy for bringing about a convergence of domestic production and domestic demand. Moreover, if the maximum benefits are to be derived, it may need to be accompanied by mammoth changes; it must be an integrated part of the overall economic development strategy.

Voluminous empirical and theoretical studies have dealt with land reform as a vehicle of redistributing income and increasing welfare of the rural poor. Even though there are divided feelings on the type and degree of impact, the majority see land reform as an instrument of increasing agricultural output,[2] capital formation, employment, demand power and technological growth, in bimodal[3] rural societies.

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[1] This is well underway. Several government agricultural projects financed by World Bank loans are currently on stream in the interior.

[2] D. Warriner, "Results of Land Reform in Asian and Latin American Countries," Food Research Institute Studies in Agricultural Economics, Trade and Development, Vol. XII, No. 2, 1973.

[3] Large concentration of land in the hands of a few. Plantation concentrated land ownership is analogous to this.

Evidence of these effects were found in many countries including Venezuela, Brazil, India (Punjab), Japan and Taiwan. Cline[1] concluded from his study of land distribution in Brazil that parcelization of concentrated land ownership will increase output substantially. This was the result of elimination of dualism of labour markets, monopsony strength in rural labour markets, and land market imperfections.

Land reform in Guyana would definitely have a positive impact on output via the reduction of dualism effects stemming from plantation monopoly of land, monopsony in the labour market, and other disparities in the two sets of production functions described in the last chapter. But it can be efficacious if, and only if, it is complemented by a well designed, programmed strategy with measures to provide investment incentives to the peasant agricultural sector. These will include changes in the institutional framework to channel funds into agricultural activities which have potentially high development impact - high income elasticity and/or linkage indices.

For instance, the land reform should be part of an agricultural development strategy coupled with industrial development planning, aimed at convergence of resources and domestic demands and with a longer term objective of export-

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[1] W.P. Cline, Economic Consequences of a Land Reform in Brazil (Amsterdam, 1970).

ing to the Caricom neighbours. The agricultural policy (public and rural) should aim at the systematic - and based on soil analysis - introduction of livestock, vegetables, fruit, industrial raw materials and fibres such as cotton. These must become the basis of rural development; for rice production, like sugar, is too export oriented and dependent on foreign demand to have any significant impact on convergence.

Careful consideration should be given to long term comparative advantage re export to Caricom neighbours and, later, to extra Caricom economies. Guyana is well endowed to supply meat products, coconut and soybean oil, corn and corn flour, and vegetables to the Caricom economies; she already supplies large quantities of rice to them. Thus, the Caricom constitutes a potential market for which Guyana's agricultural comparative advantage can be exploited for gains from trade.

A viable livestock - dairy industry, which requires large tracts of suitable land, should be one of the foremost priorities. Beef and dairy products have higher income elasticity of demand than food crops. A glance at Table A.1 in Appendix A reveals that, in 1970, Guyana's output of beef and milk were 8.8 and 4.3 million pounds, respectively (the value at 1972 prices was $G. 5.1 and $G. 3.1 million). This means a per capita production of 11.7 and 5.7 pounds of beef and milk, respectively, which is a reasonable indicator of the per capita consumption, since importation

of meat is banned and that of milk, controlled. There is considerable scope for linkages in the form of pasteurized milk, of cheese, butter, and hides for footwear manufacture, not to mention the increased distribution and marketing activities associated with the products. These, in addition to the potential for backward linkages - livestock feed, building and construction, etc. - can have a tremendous impact on output, employment and consumption.

Soybean and corn production also have potential for achieving convergence of resource use and demand. Backward linkage effects include livestock and poultry feed manufacture; forward effects lead to processing into oil, canning and milling (for corn flour). This, of course, would entail extensive research into, and evaluation of, least cost production methods, market demand, location, marketing infrastructure, employment generation, and so forth.

The two activities stressed by no means purport to lead to structural transformation by themselves. Careful research into other desirable crops should be undertaken with the long run objective of diversifying and expanding the agricultural base on which to establish a dynamic agro-industrial agglomeration. Coupled with the land reform strategy, the optimal mix of institutional incentives - credit, subsidy, tax, extension services - should, in the long run, contribute significantly to increased rural welfare and structural transformation.

It must be a programmed approach stressing efficiency

of resource use and combining the appropriate mix of *dirigisme*, co-operatives[1] and private enterprise. The overall programme must consist of a set of institutions and practices which would not only yield minimum costs per unit of agricultural output to be marketed, but also maximize the rate of growth of primary and secondary sectors.

The marketing infrastructure for agricultural produce in Guyana is extremely deplorable, especially for fruit and vegetables. These products are characterized by supply shortages and gluts, with consequent violent fluctuations in price and farm income. Thus, a specific adjoint to the land redistribution strategy should be heavy public expenditure on, and incorporation of, the distributive aspects of agricultural production in the general development strategy. This is the first step to reduce costs of distribution and increase profit margins of the agricultural producer.

The marketing thrust should extend beyond physical development. An appropriate marketing framework for development must include institutions for grading systems for products, standard packaging, weights and measures, and legal regulations. Only then can marketing play an active, rather than a "passive, cost reducing role in economic

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[1] Guyana has embarked on co-operativism as a main vehicle of "feeding, clothing and housing" the nation as shown in the 1972-1976 Development Plan.

development."[1]

Since there is a mutual interaction between land reform and technology, there will be need for increased governmental research into agricultural techniques and provision of extension services aimed at inducing increased rural investment into desirable crops and activities. Unless farmers are conversant with techniques required for new crops, the risk element is higher and supply response slow. If these hurdles are overcome, the agricultural sector will be on a course leading to a high degree of flexibility of resource use and adaptability to technological changes necessary for structural transformation.

To reiterate, convergence of agricultural production structure and domestic demand needs is of paramount importance to Guyana's ability to achieve a secular sustained growth and increased welfare. The major prerequisite for effecting such convergence is a more equitable distribution of agricultural resources to ensure the elimination of duality and factor price distortions in the agricultural sector. With a well designed agricultural development strategy there is great potential for land redistribution to effect a socially more efficient deployment of, and flexibility in, resource use.

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[1] N.R. Collins and R.H. Holton, "Programming Changes in Marketing in Planned Economic Development" in Agriculture in Economic Development, ed. C. Eicher and L. Witt (McGraw Hill Book Company, New York, 1964), p. 362.

The contention of this study is that plantation ownership and use of the larger proportion of the best lands tend to divergence (structural dependence) rather than convergence (transformation). Plantation production has been shown to be not only socially inefficient, but also dynamically biased against agricultural development in that it diverts resources away from peasant agriculture and towards continued export production. The upshot is that the potentially dynamic peasant agriculture is trapped between the Scylla of inadequate factor inputs and the Charybdis of distorted factor - product prices in favour of the plantation sector.

Thus, the contribution of plantation agriculture to the economic development of Guyana impinges on the opportunity cost of the economy's most crucial resources. The analysis has suggested that, from a socially economy point of view, the opportunity cost is reduced likelihood of effecting structural transformation, with the proviso that a framework conducive to the emergence of a dynamic peasant agricultural sector existed. Plantation agriculture and the dominance of its supporting institutional framework are predominantly responsible for Guyana's persistent underdevelopment, via precipitation of increased rural productivity, income and welfare, immizerization of growth and perpetuation of structural dependence.

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APPENDIX A

TABLE A.1

ANALYSIS OF YIELD AND ACREAGE IN AGRICULTURAL WORK

	Commodity	1970 Physical Units	Acreage	Yield Per Acre	Total Physical Output	At 1972 Prices: Total Value	Contribution to GDP
					Units as in Col. (1)	G$MN.	G$MN.
		(1)	(2)	(3)	(4)	(5)	(6)
(1)	Sugar	'000 Tons	107,100	2.9	311	61.5	46.1
(2)	Rice	Million Bags	294,280	12.9	3.8	23.9	13.4
(3)	Coconuts*	Million Nuts	35,485	1,710	60.7	4.5	4.0
(4)	Citrus	Million Lbs.	5,610	3,886	21.8	2.8	2.5
(5)	Coffee	Million Lbs.	3,250	483	1.6	1.0	0.9
(6)	Ground Provisions	" "	9,130	6,196	56.6	3.6	3.3
(7)	Plantains	" "	14,320	3,415	48.9	3.1	2.8
(8)	Bananas	" "	2,940	7,925	23.3	1.4	1.3
(9)	Corn	" "	3,120	1,312	4.1	0.3	0.2
(10)	Blackeye Peas	" "	400	850	0.3	0.1	0.1
(11)	Pineapples	" "	285	9,825	2.8	0.4	0.3
(12)	Tomatoes	" "	900	3,911	3.5	1.2	1.1
(13)	Tobacco	" "	240	970	0.2	0.2	0.2
(14)	Peanuts	" "	75	1,014	0.1	--	--
(15)	Red Kidney Beans	'000 Lbs.	--	--	--	--	--
(16)	Cabbages	Million Lbs.	140	5,000	0.7	0.2	0.1
	CROP TOTAL					104.2	76.3

* Nuts for industrial use only. This amounts to about half of total domestic output.

TABLE A.1 (CONTINUED)

	Commodity	1970 Physical Units	Acreage	Yield Per Acre	Total Physical Output	At 1972 Prices: Total Value	Contribution to GDP
					Units as in Col. (1)	G$MN.	G$MN.
		(1)	(2)	(3)	(4)	(5)	(6)
(27)	Beef	Million Lbs.	33,171	--	8.8	5.1	3.8
(28)	Pork	" "	--	--	2.6	1.6	1.2
(29)	Eggs	Millions	--	--	23.0	1.6	0.7
(30)	Poultry Meat	Million Lbs.	--	--	7.5	6.0	1.4
(31)	Milk	" "	--	--	4.3	3.1	2.5
(32)	Mutton & Goat Meat	" "	--	--	0.1	0.1	0.1
	LIVESTOCK TOTAL					17.5	9.7
	SECTOR TOTAL					121.7	86.0

SOURCE: Guyana Development Plan, 1972-1976 (Government Printer, 1972).

APPENDIX B

TABLE B.1

POPULATION AND EMPLOYMENT

	1971		1972
	No.	%	No.
Total Population (April)	730.0	100.0	748.0
(Rate of Increase - %)	2.5		2.4
Labour Force	214	29.3	218
Employment	182.0	100.0	185.4
Agriculture, Forestry & Fisheries	(57.9)	(31.8)	(58.6)
Mining and Manufacturing	(35.0)	(19.2)	(35.5)
Other Sectors	(89.1)	(49.0)	(91.3)
Unemployment Rate (%)	15	--	15

SOURCE: Ibid.

APPENDIX C

TABLE C.1

TIME SERIES DATA FOR SUPPLY FUNCTION - CHAPTER 4

(1956-1974)

Acres Y_t ('000)	Average Price Per Ton $P_{(t-1)}$ ($G.)	Average Variable Cost $W_{(t-1)}$ ($G.)	Yields (tons cane per acre) $T_{(t-1)}$
83.2	172.9	30	35.2
89.0	193.0	32	35.6
91.0	181.9	33	39.0
93.2	181.8	32	35.4
97.1	178.7	39	40.1
99.2	187.5	50	36.6
103.5	182.9	37	34.7
105.6	241.5	69	33.0
108.0	222.8	35	28.4
109.8	190.0	42	31.5
113.9	197.8	45	30.4
118.2	189.6	52	33.4
120.4	211.6	54	29.7
126.1	231.6	80	34.7
129.5	244.7	67	29.5
133.8	238.8	84	33.0
139.1	318.4	111	26.9

SOURCE: Guyana Sugar Producers' Association.

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